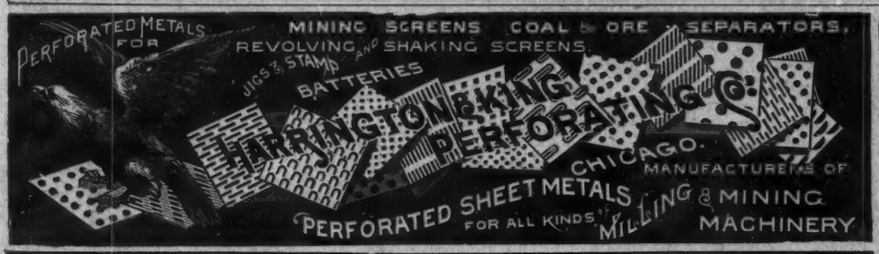
Copies for Foreign Circulation are printed on thin paper.

THE ENGINEERING AND MINING JOURNAL

EXPORT EDITION.

For the Extension of the Markets for American Manufactures.

VOL. XLIX., No. 5. NEW YORK, SATURDAY, FEBRUARY 1, 1890. PRICE 10 CENTS.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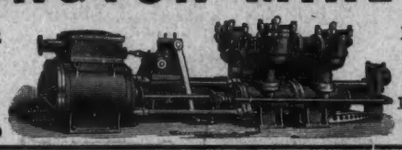

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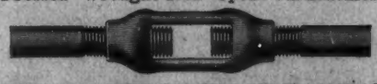

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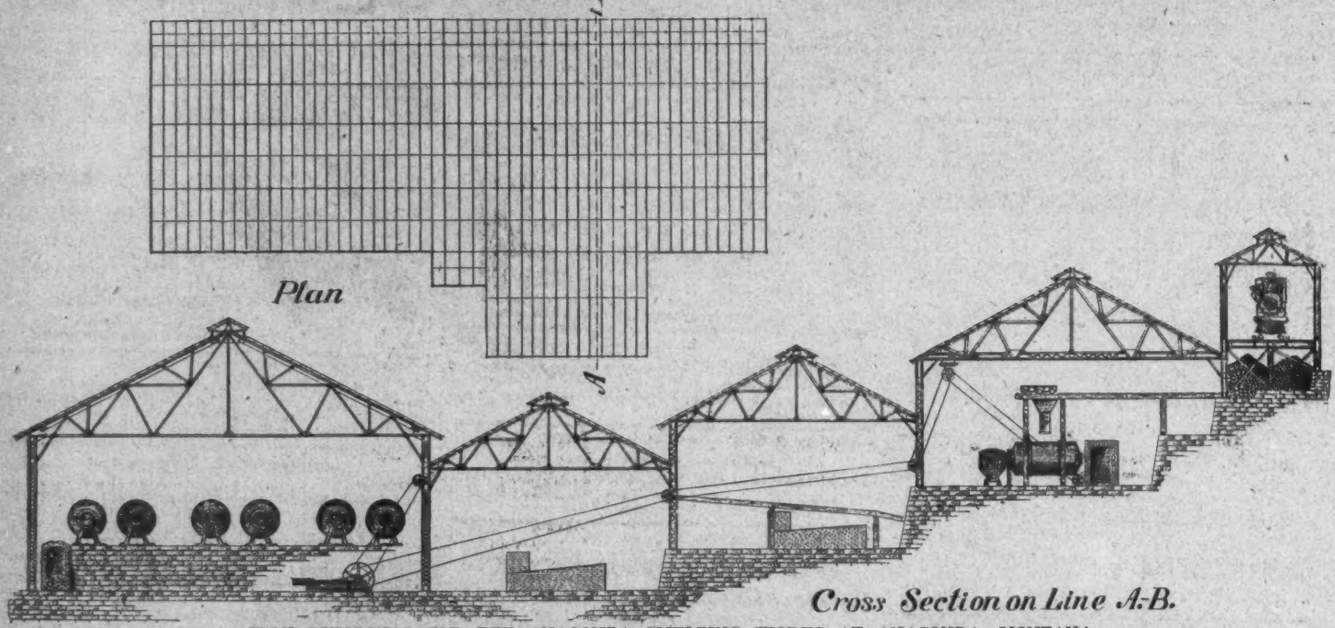

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Entered at the Post-Office of New York, N. Y., as Second-Class Mail Matter.

VOL. XLIX. FEBRUARY 1. No. 5.

RICHARD P. ROTHWELL, C.E, M.E., Editor.

ROSSITER W. RAYMOND, Ph.D., M.E., Special Contributor.

Cable Address: "Rothwell, New York." Use A. B. C. Code, Fourth Edition.

London: 76 Finsbury Pavement, London, E. C., Mr. Thomas B. Provis, Civil and Mining Engineer, Manager.
Mexico: Mr. R. E. Chism, M. E., Callejon Espirito Santo No. 4, City of Mexico.
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Weekly Edition (which includes the Export Edition), for the United States, Mexico and Canada, $4 per annum; $2.25 for six months; all other countries in the Postal Union, $5.
Monthly Export Edition, all countries, $2.50 gold value per annum.
REMITTANCES should always be made by Bank Drafts, Post-Office Orders or Express Money Orders on New York, payable to THE SCIENTIFIC PUBLISHING CO. All payments must be made in advance.

THE SCIENTIFIC PUBLISHING CO., Publishers,
SOPHIA BRAEUNLICH, Sec'y & Treas. R. P. ROTHWELL, Pres. and Gen'l Manager.
P.O. Box 1833. 27 Park Place, New York.

CONTENTS.

	PAGE.		PAGE.
Corrosion of Iron and Steel	127	The Mount Morgan Mine, Queensland, Australia	135
High-Pressure Electricity	127	*Boynton Bicycle Railway System	136
Indian Irrigation Statistics	127	Mining and Engineering in Brazil	136
Facts and Figures on Manual Training Schools	128	Quicksilver Deposits on the Pacific Coast	137
Handbuch der Tiefbohrkunde	129	*Band, Scroll and Re-saw	138
Conversation on Mines	129	The Austrian Copper Trade	139
The Right of Mine Owners in an Undivided Moiety	130	Fast Railroad Time	139
The Injurious Effects of Manganese in Amalgamation	130	High Power Incandescent Lights	139
The Steel-Eating Worm	130	A New Telephone	139
Price of Gold in China	130	Exports of Spanish Hematite Ore	139
*The Mulatos Gold Mines, Mexico	131	A River Plow	139
*The Submerged Railway of Onton on the Coast of Spain	132	Mine Timbering	139
Ferro-Chrome	133	Books Received	139
Our Production of Pig Iron in 1889	134	Patents Granted	139
The Quicksilver Mining Company, New Almaden, Cal	135	Personals, Obituary, Industrial Notes	140
		Contracting Notes	140
		Machinery and Supplies Wanted at Home and Abroad	140

* Illustrated.

MINING NEWS:	South America..145	Coal Stocks....151	IRON:
Alabama.....141	MEETINGS 145	Denver.....152	New York. ... 147
Arizona.....141	DIVIDENDS.....145	Kansas City...152	Louisville.....148
Arkansas.....142	ASSESSMENTS....145	London.....152	Philadelphia...148
California.....142	MINING STOCK MARKETS:	New York.....151	Pittsburg.....148
Coloradoo.....142	New York.....145	Paris.....152	IMPORTS AND EXPORTS.....149
Idaho.....143	Boston.....146	Pittsburg.....152	CHEMICALS AND MINERALS.....148
Michigan 143	Lake Superior Gold and Iron Stocks.....146	San Francisco. 151	BUILDING MATERIAL MARKET.149
Missouri.....143	Pipe Line.....146	St. Louis 152	CURRENT PRICES:
Montana.....143	MINING STOCK TABLES:	Trust Stocks. 152	Chemicals.....152
Nevada.....144	Baltimore.....152	MARKETS:	Minerals.....152
New Mexico.....144	Birmingham ..152	COAL:	Rarer Metals. 152
Pennsylvania....144	Boston.....151	New York. 146	Building Mat'r.152
South Carolina..144		Boston.....146	ADV. INDEX.XXXvii
South Dakota....144		Buffalo.....146	
Utah.....145		Pittsburg.....147	
Washington.....145		FREIGHTS 147	
FOREIGN:		METALS.....147	
Canada.....145			

THE reported cause of the failure of the Boston superheated water system, viz., corrosion of the iron pipes, brings before us forcibly the steel-eating worm story which has been so industriously going the round of the papers for some time, and which apparently has been taken seriously by even some of the semi-technical journals. The trouble which gave rise to the joke, or allegory, whichever it was originally, is ably described by a correspondent in this issue, evidently attributing the origin of the tale to an allegorical fashion of speech in Germany.

IN the last number of *Engineering* Messrs. FERRANTI and INCE conclude their arguments in favor of high tension electricity, in reply to Mr. EDISON'S article on the dangers of electric lighting; and, to a disinterested reader, the facts brought out and the reasoning adopted give Mr. EDISON the worst of the discussion. The old examples about steam and the speed of railroad trains are, of course, made use of, and they appeal to most people, asking who would be satisfied to work with twenty pounds of steam or travel at the rate of ten miles an hour simply because it is safer to do so. But the facts are of greater importance, and there must be a good reason why deaths have been frequent in New York, where a tension exceeding 1,000 volts is rarely used, while in London, for years, the company under Mr. FERRANTI'S management has used regularly a tension of 2,400 volts over miles of overhead and underground conductors without a single accident.

The explanation of the matter is in the insulation and the protection of the wires.

INDIAN IRRIGATION STATISTICS.

A statistical review published by the British Indian Government on the financial and agricultural results obtained from the irrigation works in India is of especial value to our legislators, capitalists or investors, and to those resident in districts likely to be affected by the large projects of this nature on foot in the United States.

In considering these results, of course, it must be remembered that irrigation in India has, on account of the conditions existing, become part of the national policy of the government, and that to carry out the works considered necessary there were only two courses open, as in many cases their urgency rendered it impossible to leave them entirely to private enterprise—viz., to construct the works and organize the districts on direct government account or by means of English companies with a minimum interest guaranteed on their capital, as was the case in creating the railroad system of India. This latter course was only adopted in one instance, and either from the scheme being ill-judged, embracing navigation as well as irrigation, or from bad management in the construction of the works or their operation, it became a constant burden on the government, and was finally bought up and is now administered by the Irrigation Department.

In the statistical returns the irrigation works are divided into two classes, major and minor works, in rather an arbitrary fashion, as some of the minor works are of more importance than some of the superior class; but generally speaking, the major works comprise those that entailed most engineering, and a portion of them required so large a capital expenditure that they were constructed with borrowed money, which was never the case with minor works, the expenditure in these cases being provided out of the general revenues of the country, in addition to which the latter were in many cases modifications or extensions of existing systems when the country was annexed. To follow the statistical results, it is necessary to note that in each of the two main classes there is a subdivision, the major works being divided into those of which the capital has been provided from borrowed money (productive works), and those of which the capital has been provided out of the general revenues of the country (protective works), and which might be appropriately termed anti-famine works. The minor works are divided into those of which capital and revenue accounts are kept, and those of which from insufficient data as to original cost no capital accounts are kept.

The returns of the area irrigated in 1887–1888 show that more than 12,000,000 acres are actually under irrigation, which figure serves to demonstrate the important part filled by this department of public works, and in the estimates of the food provided by irrigation works in a year of famine, made by the Famine Commission which reported in 1880, leaving out of consideration althogether the works comprised under the second head of minor works, as they consist largely of storage reservoirs which might fail from drought in such a year, it is calculated that no less than 24,580,000 persons would be supported. This is an astonishing result to have been achieved by forethought and engineering skill, and it is undoubtedly no exaggeration, as the estimates are based on the acreage cultivated for food crops in an ordinary year, whereas in a year of drought and famine there would be a large additional acreage put under such crops which in ordinary years would be devoted to dyes, drugs, oil-seeds, fibres and other non-edible crops.

With reference to the primary object of some of the important works, and the very considerable expenditure that had then been made upon them the Famine Commission in their report of 1880, already referred to, states "that it has been too much the custom in discussions as to the policy of constructing such works to measure their value by their financial success, considered only with reference to the net return to government on the capital invested in them. The true value of irrigation works is to be judged very differently. First must be reckoned the direct protection afforded by them in years of drought, by the saving of human life, by the avoidance of loss of revenue remitted, and of the outlay incurred in costly measures of relief." These sentences give us the keynote to the principle on which much of the work has been undertaken, and which are not applicable to the conditions governing the irrigation question in this country.

The gross capital expenditure incurred by the British Government on the irrigation works of India amounts to nearly $160,000,000, at the nominal par value of the rupee, and as a large amount of this expenditure was made when the rupee was worth nearly par, or much more than the present price of silver gives it, it is more convenient and just for the sake of comparison to figure out the cost at the nominal value of the currency of the country, giving the revenue and expenses in the same. The works on which this expenditure has been incurred yield at present (1887–1888) a net return of about 3¼ per cent. on the outlay, and the minor works of

the second division yield nearly as much more, making a return of nearly 6¼ per cent. altogether on the capital charged to irrigation works, so that apart from the various indirect benefits to the government the investment itself has proved a good one.

Of the major works (A) there are 34 systems, and the specified condition that has to be fulfilled before such works can be sanctioned is that they shall be productive, and at all events provide interest on the money borrowed for construction. The capital expenditure on this class of works up to the end of 1887–1888 was $128,113,375, and by them were provided 5,520 miles of main canal, of which 2,250 miles, or nearly half, were navigable, the length of the distributing branches being 17,135 miles, without taking into account many that have been constructed by the land owners. The works included in the foregoing statement are designed to irrigate a gross area of rather more than ten millions of acres; but some of the systems are not yet complete, and most of them have not yet had sufficient time to reach their full development. The cost per acre of irrigable area is somewhat difficult to determine, in consequence of the navigation element being introduced, but the conclusion arrived at is that about $14 may be taken as the average cost, though it is true that the great Ganges Canal, which supplies the largest area of all, only represents a cost of $9.50 per acre.

Up to the present time only ten of the 34 systems have been worked at a profit of more than four per cent. (the rate of interest charged in the accounts), but the profits on these ten have been sufficient to cover the deficiency arising from works under construction and in process of development, with a surplus to the credit of the government on all the works of this class of nearly $15,000,000.

The actual profit for the year 1887-1888, however, only showed a return of 3·28 per cent. in consequence of the expenditure of the last ten years on new works largely exceeding that represented by those works completed and fairly developed; for instance, the return from the first fourteen works constructed with borrowed money, which system commenced in 1869, and which represented an outlay of about $45,000,000, amounted in 1888 to about 8½ per cent.

The protective or famine works represent up to the date of the returns, an outlay of about $7,500,000, to irrigate an area when completed, with a further estimated expenditure of about $1,400,000, of 610,466 acres, being a capital cost of $14.50 per acre. There are six works in all, and of the five that are open partially, only two pay their working expenses; the net loss upon all the works for the year being, however, only about $33,000.

The minor works are more numerous, there being 54 of the first-class; and, taken collectively, are more remunerative than the productive major works. The completed works comprise about 3,416 miles of canals, of which about 1,050 are for navigation purposes solely, and in connection with these systems there have been constructed 2,648 miles of distributory branches. The area irrigable is approximately 2,090,000 acres, and the net returns from three important districts are 10·15, 13·01, and 18·04 per cent. on the capital outlay respectively. The total result shows a return from the whole class of 4·16 per cent.

The minor works of the second class, although generally of little importance in themselves from an engineering point of view, are of considerable value to the country, both from an agricultural and financial standpoint. A great number of them are storage reservoirs, serving each a limited area and subject to failure in protracted drought, while others are simply inundation canals, which are also somewhat uncertain owing to insufficient rise in the rivers in a dry season to supply them. Yet, in spite of this, the revenue derived from them in the fiscal year 1887–1888 was about $4,575,000, and their importance from an agricultural point of view is also shown from the area irrigated, which, in the year referred to, was 4,852,684 acres.

The total area irrigable in India when the works under construction are completed will amount to about 18,000,000 acres. The rates payable for water are from 50 cents an acre for rice crops in some parts of Bengal up to $10 an acre for sugar cane in Bombay. The average rate is rather less than $1.50 an acre.

All the preceding figures, however, of direct return to the government on the capital expended are lost sight of when the value of the crops is taken into account—a value which may be said to be absolutely created by the works—and is sufficient evidence of the importance of a well-directed and comprehensive scheme of national irrigation. It may be safely stated that the value of the crops raised in the irrigated areas in the year 1887–1888 was over $150,000,000, of which more than one-half was entirely due to the water supplied, and in a year of drought this proportion would naturally be largely increased. The exact valuation from the greater portion of the area (four provinces) would make the value $165,000,000; but as the valuation was not exact in the other two provinces, the estimate of value is fixed as above.

The rainfall varies from an average of three or four inches in Sinde and some parts of the Punjaub, where no crops could be grown without irrigation, to 40 or 50 inches in Bengal; but even here the irrigated crops give a better return than those without irrigation by about 20 per cent.

FACTS AND FIGURES ON MANUAL TRAINING SCHOOLS.

The report of the Commissioner of Education for the year 1887-8, recently issued, devotes considerable space to the subject of manual training schools. The greater part of the space is taken up by a symposium of opinions of superintendents of schools and others concerning the value of manual training as a part of a liberal education, and this portion of the report is of neither greater nor less value than other publications of such opinions, with which we are now almost surfeited. The report is especially valuable, however, in giving us the results of the first attempts which have been made to collect statistics of manual training in public schools. We give herewith an abstract of these statistics, and they are well worthy of study by all who are interested in the progress of modern educational ideas. They show that manual training has now passed beyond the stage of argument and discussion, and has entered that of tentative development. Opinions are no longer asked for by those acquainted with the purposes and objects of manual training as to whether or not it is advisable to introduce it as a branch of school education, but instead of this the vital questions now are, How shall we introduce it, as a department of the public school system or otherwise? how are the necessary expenses of introducing it to be met, and which of the many systems in use in different cities shall we adopt as our model?

A glance at the table giving a list of the separate manual training schools shows a great variety in their grade, character, cost and relation to other institutions. The Denver school is a department of a seminary of the Methodist Church. One of the Chicago schools is owned by a commercial club, while the other is part of the public school system. The schools in New Orleans, Minneapolis and St. Louis, and one school in New York and one in Philadelphia, are departments of existing colleges. The school in Cleveland is owned by a private corporation, but its running expenses are paid by the city. Chicago, Baltimore, Omaha, Toledo and Philadelphia have also manual training schools in connection with the public school system. The school in Brooklyn is part of the Pratt Institute, which is privately endowed. The school at Crozet, Va., is also handsomely endowed, but its usefulness is restricted by its benefits being confined to students in one county in Virginia.

Besides the eighteen separate schools above referred to, the tables give statistics of manual training classes established in the public schools of twenty-six different cities. It appears that twenty of these classes have been established for only three years or less, which shows how recent has been the growth of the manual training idea in the public school boards. One place, Jamestown, N. Y., has had manual training for twelve years; then in order of age come Boston, eight years; Montclair, N. J., seven years; Moline and Peru, Ill., each six years, and Eau Claire, Wis., five years. Washington, D. C., appears to have introduced the system most extensively, no less than 38,450 scholars receiving manual instruction; New Haven comes next with 12,000 pupils, then Boston with 11,850, then Paterson, N. J., with 7,913, then New York with 6,176, then Jamestown, N. Y., 1,674. It thus appears that some of the smaller cities, as Paterson and Jamestown, are far in advance of the large cities in the extent to which they have introduced manual training as part of the public school system.

Another noticeable thing in connection with these statistics is the small cost of introducing manual training into the public schools. Its supposed high cost has been hitherto one of the chief objections to it; but it appears from the tables that Washington instructs 34,850 scholars with a plant costing only $5,000; New Haven instructs 12,000 with a plant costing only $1,000; while in Meadville, Pa., only $90 was spent for an outfit for teaching 1,525 scholars. Of course, in this case the outfit must consist only of a few hand tools; but it shows how easily a beginning can be made in manual training, and that it is not necessary to begin with an expensive plant and high salaried teachers.

A few facts concerning what is actually being done in some of the manual training schools and classes are here appended:

Jacksonville, Fla.—One of the graded schools (for colored boys) has had an addition made to it for industrial instruction. Work was begun in November, 1887, with 76 boys and 98 girls from 14 years and upward. The work at this school, says the superintendent, has strengthened greatly the conviction that industrial training must come into the public school system.

Beardstown, Ill.—The boys enjoy the work very much. Accuracy, patience, and a quickening of the observing powers are noticeable results. A few boys who are exceedingly stupid in other work are among the best in drawing and shop work.

Peru, Ill.—The superintendent says that he finds manual training renders pupils accurate and ready thinkers, causes them to understand the effects of an error, pleases the pupils and their parents.

Baltimore, Md.—The school commissioners say: An inspection of the work of the school will show that it is thorough and practical, and that in proportion to the means appropriated for its support it is accomplishing most excellent results. The city superintendent says: The successful establishment of this school has satisfactorily met the demand for introducing manual training into schools, in which pupils of about

fourteen years of age with a good grammar school education are taught, but there still exists a demand for the introduction of manual training into the primary and grammar schools.

Cambridge, Mass.—Manual training has now been tried in Cambridge for four years. Annually seven classes, each from one of seven schools, have received elementary instruction in carpentry. Mr. FREDERICK H. RINDGE has come to the aid of the school authorities and presented them with a fully equipped industrial school building.

Springfield, Mass.—The appropriation of $3,000, for the continuance of manual training, shows, says the school committee, the favorable opinion of coeducation of hand and brain held in this community.

Winchester, Mass.—The manual training department, limited to sewing and carpentry, has given sufficient satisfaction to have its existence continued.

Concord, N. H.—The results obtained are extremely gratifying, and the interest among the pupils is great. No diminution of interest in regular school work is noticed in pupils attending the manual training school.

Hoboken, N. J.—We are confident that this is a part of education which will never be thrown aside or become useless. It can be prosecuted quite successfully in the class room.

Montclair, N. J.—Manual training is both intellectually and morally advantageous. Pupils lose nothing, but rather gain in the purely intellectual branches. Self-respect and ambition are frequently first awakened by success in manual training.

Paterson, N. J.—The superintendent says: The results obtained in woodworking, etc., in the training shop have been very encouraging. The pupils have been enthusiastic in their interest, and many have exhibited natural skill or mechanical skill.

Albany, N. Y.—The superintendent says: From our brief experience, we believe that it is established that manual training is legitimate education work in our schools; that its tendency is to keep boys longer in school; that its effect is to round out the development of the pupil; that it promotes good order and discipline; that it has a moral force, and that it dignifies labor by removing false notions of degradation.

Jamestown, N. Y.—Already we have passed the limits of the field of experiment, and many of our children are receiving the benefits of this department of instruction.

Pittsburg, Pa.—The cooking school has been wonderfully successful and is very popular with our people. It is likely that one or two more will be opened.

Now that manual training has advanced so far as to have not only a literature but tables of statistics, we may look for a very rapid extension of the system in the immediate future. Indeed, there is no reason now why every board of education in the country should not at least begin to study the subject, even if its financial condition or other surroundings do not warrant taking actual steps toward its establishment.

MANUAL TRAINING SCHOOLS.

Place.	Name.	Years in operation.	Connection.
Denver, Colo.	Haish M. T. School.	4	Dept. of Colo. Seminary of M. E. Church.
Chicago, Ill.	Chicago M. T. School.	5	Owned by Commercial Club of Chicago.
Chicago, Ill.	M. T Dept. of Chicago High School.	3	Part of Public School System of Chicago.
New Orleans, La.	M. T. Dept. of Tulane University.	5	Part of Tulane University.
Baltimore, Md.	Baltimore M. T. School.	5	Part of Public School System of Baltimore.
McDonough, Md.	McDonough Institute.	16	Belongs to city of Baltimore, but is not part of the Public School System.
Minneapolis, Minn.	School of Practical Mechanics and Design.	6	A Dept. of the College of Mechanic Arts of the State University.
St. Louis, Mo.	M. T. School of Washington University	9	A Dept. of the University, but of lower grade.
Omaha, Neb.	M. T. Dept. of the High School	4	A Dept. of the Public High School.
Brooklyn, N. Y.	Dept. of Mechanic Arts of Pratt Institute.	2	A Dept. of Pratt Institute.
New York, N. Y.	Hebrew Technical Institute.	5	Sustained by subscriptions.
New York, N. Y.	M. T. Dept. of College of the City of N. Y.	6	A Dept. of the College of the City of N. Y.
Cincinnati, O.	The Technical School of Cincinnati.	3	Under the auspices of the Technical School Association.
Cleveland, O.	Cleveland M. T. School.	3	Owned by a private corporation. Running expense paid by the city.
Toledo, O.	Manual Training School.	5	Connected with City High School.
Philadelphia, Pa.	M. T. Dept. of Girard College.	7	A Dept. of Girard College.
Philadelphia, Pa.	Phila M. T. School.	4	Stands in same relation to the Public School System that the High School does.
Crozet, Va.	The Miller Manual Labor School.	11	Endowed, self-sustaining, and isolated.

MANUAL TRAINING SCHOOLS.

	Property Values. Apparatus.	Property Values. Real Estate.	Receipts from all sources.	Expenditures for Buildings and Improvements.	Expenditures for Salaries.	Expenditures for Tools and Machinery.	Expenditures for Material used.	Number of instructors in manual training.	No. of pupils in manual training.
Haish School	$2,500	$25,000	.....	.....	.....	.....	.....	1	25
Chicago School	15,000	75,000	$18,050	$545	$14,220	$761	$833	4	202
Chicago High School Dept.	.....	.....	3,588	.....	3,140	26	422	2	85
Tulane University Dept.	30,000	25,000	.....	.....	.....	.....	.....	4	265
Baltimore M. T. School	20,000	28,560	16,000	400	11,100	5,000	1,500	7	601
McDonough Institute	1,000	287,527	43,642	.....	4,421	.....	.....	3	90
Minneapolis School	1,000	35,000	.....	.....	.....	.....	.....	3	78
St. Louis M. T. School	10,000	45,000	18,367	.....	16,458	1,400	870	4	222
Omaha High School Dept.	2,457	.....	2,500	170	1,850	150	147	1	94
Pratt Institute	.....	.....	.....	.....	.....	.....	.....	4	15
Hebrew Technical Institute	7,500	55,000	11,000	1,000	10,500	750	750	4	130
N. Y. City College Dept.	.....	.....	.....	92	.....	263	122	2	198
Cincinnati Technical School	3,000	.....	5,000	....	4,600	1,200	300	1	62
Cleveland School	20,000	20,000	17,700	.....	.....	.....	.....	4	140
Toledo School	18,000	25,000	10,200	.....	6,500	3,000	1,200	6	200
Girard College Dept.	(100,000)	.....	.....	.....	7,344	(2,229)	.....	5	450
Philadelphia School	2,500	46,000	19,211	3,763	14,025	700	693	4	326
Miller Manual Labor School	35,000	325,000	71,902	15,766	15,627	1,064	1,661	8	267
	(100,000)					(2,229)			
Total	181,957	992,027	237,160	21,766	109,785	14,314	8,498	67	3250

MANUAL TRAINING CLASSES IN PUBLIC SCHOOLS.

System of Public Schools.	Number of years since intr'd'c'n.	Number of instructors.	In woodworking. Boys.	In Sewing. Girls.	In cooking. Girls.	In construction work.	Whole number.	Cost of Plant.	Teachers' salaries.	Cost of material.	Cost of new tools and repairs.	Cost of incidentals.
New Haven, Conn.	3	3	240	all.	all.	.....	12,000	$1,000	$900	$119	....	420
Washington, D. C.	3	14	1020	3,000	921	34,850	34,850	5,000	7,550	500	...	....
Beardstown, Ill.	3	1	50	.....	0	.....	50	200	300	25	10	10
Moline, "	6	...	...	.....	....	all.	.....	.....	.....	113	...	....
Peru, "	6	2	20	18	....	....	42	300	125	20	5	0
Humboldt, Iowa	2	1	24	0	0	24	24	100	100	20	....	....
Oskaloosa, "	3	...	...	.....	.....	.....	*	.....	0	100	...	....
Boston, Mass.	8	36	350	10,000	1500	0	11,850	.....	.....	.....	...	....
Springfield, "	3	1	126	0	0	0	126	500	1,200	188	806	118
Winchester, "	2	2	15	250	0	0	265	150	300	100	....	...
Minneapolis, Minn.	2	5	150	.....	.....	.....	.....	.....	.....	.....	....	....
Stillwater, "		1	...	.....	.....	.....	.....	300	.....	.....	....	....
Concord, N. H.	3	1	100	0	0	0	100	500	700	150	100	50
Montclair, N. J.	7	1	40	115	0	40	230	350	450	.....	.....	....
Paterson, "	2	1	378	.....	....	7,913	7,913	198	940	440	424	82
Albany, N. Y.	1	1	250	0	0	0	250	600	800	175	10	15
Jamestown, "	12	7	148	155	12	1,324	1,674	.....	1,200	80	10	15
Newburgh, "	3	2	101	434	0	0	600	705	1,400	479	1080	99
New York, "	1	8	398	1,919	311	6,176	6,176	4,509	1,491	3075	....	301
Meadville, Pa.	2	..	0	0	0	1,525	1,525	90	350	50	...	....
New Brighton, Pa.	3	3	50	50	0	0	100	500	400	....	0	...
Pittsburg, "	2	..	0	0	300	0	300	800	1,100	200	...	....
Tidioute, "	3	4	32	100	0	0	200	2,000	900	200	500	50
Knoxville, Tenn.	1	5	50	105	105	0	.....	.....	1,447	115	199	361
Eau Claire, Wis	5	3	54	0	0	0	175	325	720	30	10	5
La Crosse "	3	...	...	.....	....	all.	.....	.....	.....	.....	....	....
Total,		104	3552	16,146	3149	51,828	78,450	18,127	22,373	6179	3154	1526

* Donated.

NEW PUBLICATIONS.

HANDBUCH DER TIEFBOHRKUNDE. By TH. TECKLENBURG. Part I.: The English, German, and Canadian Systems of Boring. Published by Baumgärtner, Leipzig, 1886. Paper, 8vo., 116 pp.; with 34 wood-cuts and 22 lithographic plates. Price 8 marks.

The series of six volumes, of which this, a general discussion of the English, German, and Canadian systems of deep boring, forms the first, is a notable contribution to the literature of the subject, and is the most thorough work of the kind published in the German language since Beer's memoir, which appeared in 1858. The author has had the advantage of personal study of several hundred deep bore-holes, and has acted as consulting engineer to many important enterprises.

While a great deal of detailed information is given regarding the practice in the countries mentioned, it is to be regretted that the United States, where the boring operations are not only more numerous but are also conducted under more varied conditions than elsewhere, does not receive its appropriate share of description. The borings for petroleum, natural gas, brine, and artesian wells in this country are certainly of the first importance. But the book is interesting as an exponent of foreign methods.

The plates illustrating well-boring tools add much to the value of the Handbuch; and the bibliography appended will prove useful, though it omits some well-known American publications.

Part II. describes the spülbohrsystem; Part III., the diamond drill; Part IV., rope drilling; Part V., the protection of bore-holes, and Part VI., shaft-boring.

CONVERSATION ON MINES, ETC., BETWEEN A FATHER AND SON. By WILLIAM HOPTON. Reprinted from the eighth English edition, by the J. B Lippincott Company, Philadelphia. Cloth, 8vo; 326 pp.; illustrated. No table of contents; no index. Price, $1.25.

This little book is the production of a hard-working English coal miner who has risen from the ranks to positions of trust by his own efforts. His book is designed for the instruction of colliery operatives and laborers, and has met with a very flattering reception by the class for whom it is intended. The present issue is a reprint from the eighth English edition, the first having been published about 1864.

As a specimen of book making the "Conversation" is decidedly unique

The form is a series of questions supposed to be put by a son to his father, the latter being a miner. The principal topics are: How mines generate gases; why the discharge is greater in one mine than another, and how others discharge a mixture of gases; how the weather on the surface of the earth affects the workings of a mine; the power of explosions, and how to diminish it; several ways of ventilating mines, and how currents of air are propelled around the working; the friction of the ventilating currents, and how to diminish it; with several ways of working out coal; together with numerous questions and answers on miscellaneous mining matters. It will thus be seen that the work applies only to a portion of the practice of coal mining, though a number of miscellaneous tables are appended. The language is plain, homely, and would sometimes be amusing from the intense personality and quaintness which pervade it, were the reader not constantly impressed by the strong common sense and sincerity of purpose of the writer. The arrangement of matter is far from systematic, and the test is often rambling, while the absence of a table of contents and an index, together with irregularities of captions and omission of running heads, make the book an awkward one for reference. At the same time it certainly contains much practical information, especially in regard to gases, ventilation, explosions, coal getting and some antiquated information about surveying, which give it a value in its particular field, though, unfortunately, the information in regard to several departments is not up to the present state of the art.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

All letters should be addressed to the MANAGING EDITOR.

We do not hold ourselves responsible for the opinions expressed by correspondents

The Rights of Mine Owners in an Undivided Moiety.

EDITOR OF THE ENGINEERING AND MINING JOURNAL:

SIR: The following case has occurred, and if you or any of your readers can throw any light upon the subject it would be interesting to many.

A party of gentlemen mostly of Helena, Mont., have purchased seven-eighths of the "Fourth of July" mine in Ruby District, Okanagan County, Washington, and have incorporated these seven-eighths of the property under the laws of Montana. The other one-eighth is held in Portland at too high a figure in the estimation of the Montana parties. What relation does the owner of the one-eighth hold towards the corporation, and *vice versa*. Yours truly,

OREGONIAN.

PORTLAND, Jan. 14, 1890.

The Injurious Effect of Manganese in Amalgamation.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In your issue of January 18th, Mr. Louis Janin, Jr., in his article on "Some Metallurgical Experience with the Ores of the Ontario Mine, Utah," makes two statements which I italicize to suit myself. He says (1): "Upon the Comstock and elsewhere, *the results in amalgamation were poor when the percentage of manganese was high, and vice versa.*" (2) "To determine what the effects of the manganese might be on the ores in question, I made repeated experiments. . . . The results surprised me. I found *that the presence of the manganese had but a slight, if any, effect upon the amalgamation*, and the cause of our trouble had to be sought elsewhere."

If, as I suspect, Mr. Janin's first statement was derived from hearsay, then his experience and mine have been similar. The popular outcry against manganese first reached my ears from Pioche, Nev., whence it was caught up and repeated in various other mining camps. So far as I am aware, it was not very loud on the Comstock nor very general, but it seemed to prevail greatly in Tombstone, Ariz., at one time at least. I treated, at various times on a large scale, several of these troublesome manganese ores, which always proved tractable as soon as I ceased quarreling with the manganese. Indeed, in certain cases I suspected that this material might be a good thing to have in the ores, at least in limited quantity.

My inquiries as to the foundation of the manganese theory failed of satisfactory results. The idea seemed to be held principally by the so-called "practical" millmen, and the few educated engineers whom, on questioning, I found inclined to the theory appeared to have accepted it without practical research of their own. Still, as I have found that the "practical" man's ideas have generally a noteworthy basis somewhere, although not necessarily just where he thinks, I held my judgment in reserve until I should get more light. But I have been curious to learn why it was that manganese should be so friendly to me (and to Mr. Janin), and apparently so inimical to others.

A. D. HODGES, JR.

January 22, 1890.

The Steel-Eating Worm.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The above title reminds me of the ice-worm story. The newly-appointed managing director of a large brewing company received, after midnight, and while at a social gathering in a neighboring town, the hurried message that the "ice-worm" had made its appearance in the cold-storage vaults of his company. As the director had heard before of rapid agricultural devastations by locusts and potato-bugs, his vivid imagination depicted to him the possibility that this until then unheard-of vermin might destroy, at short notice, sufficient ice to swamp the next quarterly dividend, or do even worse. He, therefore, determined to repair to the spot immediately, gave orders to have his horse saddled, and rode out into the dark, stormy night without having noticed the half suppressed smiles of the boon companions who watched his sudden departure.

The steel-eating worm has, however, nothing in common with this Bohemicus communis, or fake worm. It is in, fact, a truly scientific insect, and its existence, like that of other scientific insects, such as the microbes and bacillæ that are held accountable for the spread of contagious diseases, is usually discovered after the partial destruction of iron and steel structures becomes epidemic as it were, the local causes of the frequency of the breaks not being readily apparent.

From the rather incoherent descriptions contained in several of your exchanges, which you had the kindness to place at my disposal, I might have been led to infer that the steel-eating worm belongs to a certain kind of mollusks (Dolium galea Lk.), whose saliva contains nearly 3½ per cent. of ready-made sulphuric acid (see Barker's Elementary Chemistry), but I pride myself in having hit the right thing at once by recognizing that it is actually a kind of "ring-worm"—*i. e.*, the ferrivorous "Paradoxides* solubilis," which is apt to form in the rust of iron and steel when said rust contains or absorbs "oleum sulphuris per campanum" or its oxidized constituents.

The exhaustive researches recently instituted by the German Government (Dr. Wm. Thörner in "Stahl & Eisen," October, 1889), for the purpose of determining why railroad iron had rusted in several tunnels *more* rapidly than that which had been laid on the open track, have brought to light some highly interesting statistics as to the quantities of SO that have been found in various kinds of rust. Thus, the rust taken from rails and (metallic) sleepers in 19 tunnels contained from 0·3 to 3·1 per cent. SO_3; from rails and sleepers in the open track, 0·6 to 1 per cent. SO_3; from old rails stored in the yard, 2·3 per cent. SO_3.

The rust from rail-heads on the London Underground Railway	2·7 per cent.
" the rail-chairs	4·2 "
Highest percentage from selected detached particles	7·9 "
Rust on hooks of lightning-rods	3·3 "
" iron chains	5·5 "
" iron wall hooks	3·5 "
" old door hinges and on anvils	1·8 "
Rust produced on bright wire which had been inserted in a glass tube open at both ends, and kept in a large open place where only air and rain could get at it	1·4 "
Hammerscale	1·1 "
Rust from old sheet iron	0·9 "

How the SO_3 gets there is a question which can only be answered in detail by taking into consideration geological and atmospheric conditions that vary considerably in different localities. The more general causes of its occurrence are, according to Thörner, probably as follows: The smoke from the combustion of coal and coke, as carried off through flues and chimneys, usually contains some free SO_3 and a good deal of SO_2. The latter combines with the free ozone and ammonium nitrate of the atmospheric air to SO_3 or even to ammonium sulphate, which are absorbed and carried about by the watery vapors of the atmosphere and finally reconveyed with them, by dew or rain, to the earth.

It has also been shown how iron, in the presence of moisture that does not even contain either nitrous nor nitric oxide, can unite directly with hydrogen sulphide (H_2S), that ferrous sulphite ($FeSO_3$) oxidizes readily in the presence of such moisture (or pure water) to ferrous sulphate ($FeSO_4$), that the smoke evolved from the stack of a single heavy locomotive during one hour's trip may give rise to the formation of nearly *five pounds* of SO_3, and, in short, that the conditions of the atmosphere, especially in or near cities, are such that the rusting of iron and steel seems to be much more abundantly and frequently caused by, or connected with, the presence of oxidized sulphur than is usually thought of. But now to the worm—the ferrivorous Paradoxides solubilis, the discovery of which is of much older origin than the investigation above referred to.

Under conditions that are favorable to its coming into existence, sulphuric acid combines with iron to ferrous sulphate, the latter becomes oxidized to ferric sulphate, and that splits up into a basic and an acid salt, the basic salt having (according to the analysis reported by Dr. K. List † in 1883) the composition $5\ Fe_2O_3\ SO_3$ = ten parts of ferric oxide to one part of SO_3. The freed or residuary acid salt reacts on the next particles of metal and thereby forms fresh ferrous sulphate,‡ that again turns into ferric sulphate, and these reactions may repeat themselves a good many times, but in diminishing proportions. If, however, the basic salt that is left behind in the trail of the worm should receive new accessions of acid from without, as by the absorption of moisture containing SO_3 or SO_2, then the circuit of corrosion and decomposition is complete, and the consequence may be that the metal thus affected, whether wire, boiler plate or girder, will become wormeaten throughout its whole thickness.

At the temperature of high-pressure steam, SO_2 distills over, hence—if the feed water contains some—the "worm" may even get into steam pipes, and create sad havoc when the steam becomes condensed, as, for instance, in the return blow pipes of steam-heating plants.

Whether the "worm" be already gnawing at the Brooklyn Bridge, or eating up the elevated railroads, is thus far, probably, only a rather extravagant conjecture. Still it should be born in mind that oil-paint, minium, and paraffine, with which pieces of rails were coated for the purpose of ascertaining experimentally how much protection such coatings afford against the attacks of acid gases, have given unsatisfactory results, as these paints became more or less corroded after three months' exposure to the aforesaid.

"INFLUENZA."

Price of Gold in China.—The price of gold is in ordinary times abou $32 ro $33 in silver per ounce; but owing to the present high rate of the necessaries of life—rice, cabbage, and fuel—gold is just now very cheap. At Soochow, gold can be purchased at $28 or $29 in silver an ounce, which is lower than it has been for four or five years. The price of gold at Peking has been of late years about Tls. 23 in silver per ounce. About a month ago the price went down suddenly to about Tls 21, owing to the arrival of a high official's family at Peking with a great store of gold ornaments, which they were in haste to convert into money for the purchase of land and houses. After the northern rivers have become ice-locked for the winter, there is a rise in gold, owing to the great demand for it among merchants who find it much more convenient to take up-country for their wholesale purchases than the baser metals would be.—*Hu Pao.*

* Paradoxides Behemicus. A "fishy" or fish-like petrefaction of the silurian formation.

† The pernicious effect of ferric sulphate on steam boilers. Feitschrift, d. V. D. J., Berlin, June, 1883.

‡ The above article does not contain any equation that is illustrative of this change, nor was the water of the basic salt analytically determined.

THE MULATOS GOLD MINES, STATE OF SONORA, MEXICO.

Written for the Engineering and Mining Journal by Louis Janin, Jr.

As the mines of the Mulatos District have recently been purchased by a syndicate, at the head of which is the mining firm of Hayward & Hobart, of San Francisco, the following brief description from notes gathered during an examination of the property, while acting as assistant to some prominent mining engineers, may be of timely interest:

The town of Mulatos is situated on the western slope of the Sierra Madre, some 213 miles east of Ortiz, a station on the Sonora Railroad. It is reached by wagon road, over level plateaus, as far as Soyope on the Yaqui River, thence by trail. The town contains about 1,000 inhabitants. It lies only 3,000 feet above the level of the sea, although the trail at several points reaches the elevation of 5,000 feet.

It is on record that these mines were discovered in 1806 by Indians, who, after washing up a creek flowing into the Mulatos river, came upon rich placers close to three small peaks, which proved on further examination to be auriferous. Some seams of decomposed ore near the surface, worked in a primitive manner, yielded, it is said, at the rate of $1,000 to $16,000 per ton.

After passing through various hands, and having even been abandoned for some time, the mine came into the possession of the Aguayo Bros. These owners gradually developed the property, and out of the proceeds of the mine finally erected a 60-stamp mill and began to open the mine somewhat after the American manner. The Aguayos ultimately obtained a governmental concession, which gave them clear title to all the mines in a large area of land, and further granted them the privilege of cutting timber in the neighboring forests, as well as permission to divert the water of the Mulatos river.

THE MULATOS MINES

consist of a series of segregated and large exposures of quartzite carrying gold. The great extent of two of these bodies are indicated in Figs. 1 and 2. There are other bodies of even greater dimensions. It is a marked peculiarity of these bodies that the gold is disseminated throughout the mass of quartzite, none of the numerous assays having shown an inappreciable amount of that metal.

Each large exposure is called a mine, and, in fact, constituted a separate claim until the all-embracing concession was obtained. The principal mines are: La Dura, Blanca y Colorada, La Gloria, Descubridora, and La Restauradora.

The first-mentioned is at a distance to the west of the others. The remaining four are found along a prolongation of the section, Fig. 2. It is not improbable that these exposures follow a line of faulting, having approximately the same course. Its direction is N. 35 degrees E., and the bodies occur over a distance of a mile. These mines will be referred to in order of their development.

The first is the Blanca y Colorada, the principal underground work having been executed at this point, furnishing the chief supply of ore for milling purposes. In Figs. 1 and 2 it will be seen that, with the exception of a small peak, this body of quartzite is completely covered and bounded by porphyry.

The quartzite throughout is in a brecciated condition, resultant from the immense pressure coincident with the eruptive overflow. The mineral-bearing solution permeated this brecciated mass, depositing iron pyrites, inclosing the gold, in the minute fissures and fractures. Owing to the insolubility of the quartzite there was no metasomatic action. The pyrites, in time, were decomposed, and the resulting sulphate of iron leached out. Except in the quartzite near the porphyry capping, there is no evidence of any higher oxidation of the iron, the quartzite being white and unstained. Near the capping, however, where the hot alkaline solutions were more thoroughly exposed to atmospheric influence, the somewhat sintered quartzite is stained, and frequently shows the irridescent colors of ferric oxide.

As a very coarse crushing eliminates the greater portion of the gold from the gangue, the metallic deposition must have been confined principally to the fractures and minute fissures. The fact that crystals of carbonate and sulphate of lime with gold deposited on their surfaces are not infrequently found in the seams of the quartzite strengthens the theory that the quartzite was impregnated subsequent to its brecciation. Hilos, of thread-like veins of these minerals, accompanied by alkaline sulphates, furnish a guide to the miners in prospecting.

FIGURE 1.

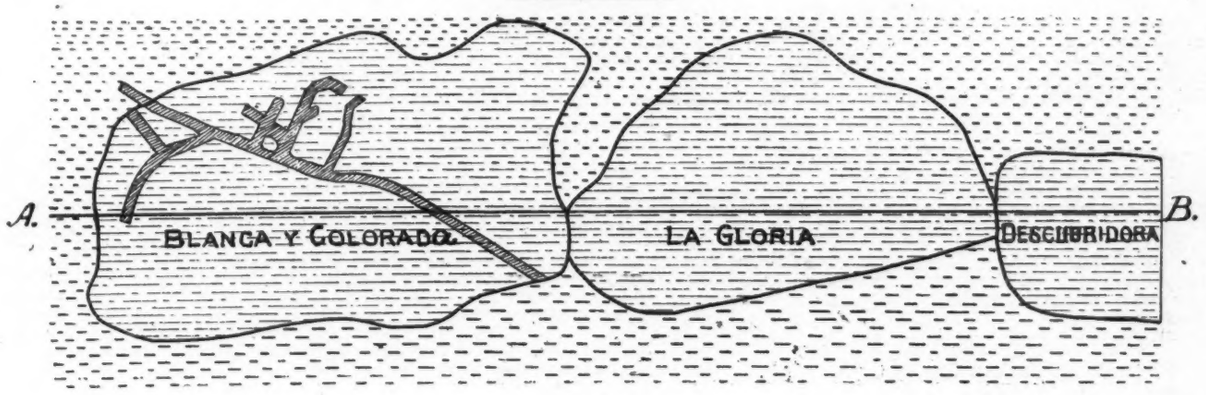
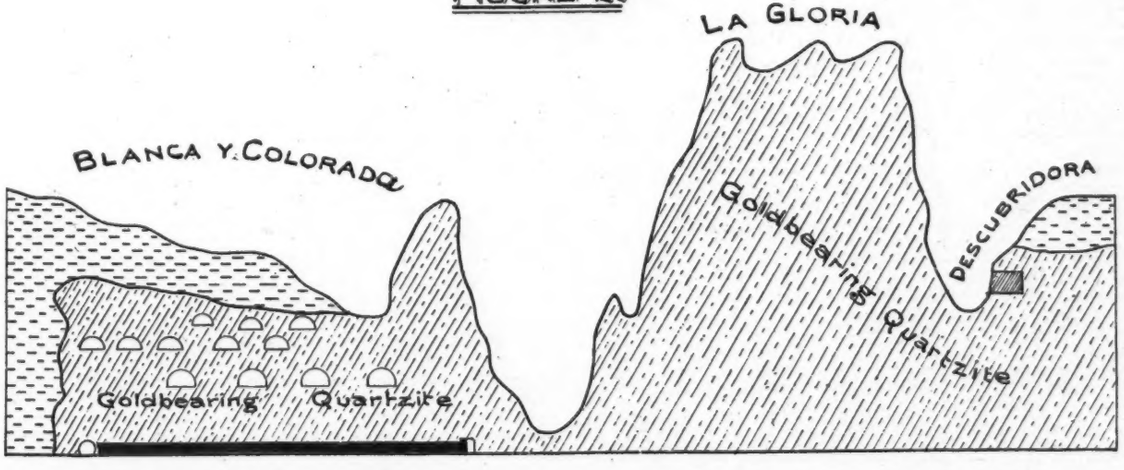


FIGURE 2.



As the porphyry itself assays in places $6 to $9 per ton, it is not improbable that it was the original matrix of the gold. Indeed, the porphyry walls are altered to a white, chalk-like mass to a considerable distance beyond the point of contact with the quartzite.

It is, of course, not to be expected that gold is disseminated in uniform quantity through massses of so great a magnitude. In other words, rich shoots or zones must occur with the intervening spaces carrying ore of a lower grade. This is the case at Mulatos. These zones seem to bear no relation to one another, but seem to be influenced by their proximity to the porphyry, and governed by the physical condition of the quartzite, probably occurring on lines of more intense brecciation. One of the richest of these zones is in the highest level of the mine, immediately under the porphyry capping. Five samples from this, representing 220 linear feet of ground, averaged $46.40 per ton.

On the middle level there is a slip at right angles to the course of the quartzite, distinctly marked by a seam of kaolinized porphyry called *jaboncillo*. Along this slip there was an intrusion of porphyry forming a horse in the midst of the quartzite body. Near this horse was found one of the richest stopes in the mine.

The mine has been opened upon four levels, extending from the capping to about 150 feet below. The greatest amount of work has been done on the second level below the porphyry capping. From this portion of the mine 62 samples averaged $9.83 per ton. On the level below this, 21 samples, representing about 735 linear feet of ground, averaged $8.21 per ton. In the lowest, or tunnel level, the one shown in Fig. 1, but little work has been done. The tunnel runs for over 250 feet through low

grade ore before encountering a rich zone. Eight samples from the zone, representing 280 linear feet, gave an average of $26.12 per ton. More prospecting work upon this level would probably discover other zones of rich ore. Twenty-two feet below this level a tunnel was run from the ravine, through porphyry, until it encountered the quartzite. From its face two samples gave $16.50 and $17.50 respectively.

The mine has been worked in the Mexican manner, in large chambers without timbers, leaving pillars at appropriate distances. This system is now in use at the Caledonia gold mine, in the Black Hills, and is said to have effected a great saving, and to have made dividends possible from ore of low grade. The only foreign innovations introduced at Mulatos are car tracks, mining cars and giant powder. The mine has been opened over a length of some 500 feet, showing the body of auriferous quartzite to be of about that length, and over 300 feet wide. In the lowest level there is a zone of rich ore which promises a continuation in depth. In this mine there are many thousand tons of ore in reserve.

In 1888 about 30 miners were employed. The wages paid were from $1 to $1.50 per day. In stoping and drifting they were paid by the depth of the holes they drilled, $1 per vara (32 inches) being the current rate. No. 1 giant powder was the explosive used. In working this mine on a large scale it would probably be economical to drift with large headings, using air drills, chambering the drill holes and using a slow-acting powder. In this broken ground a quick-acting powder with a high percentage of nitro-glycerine blows out only a narrow chamber the length of the drill hole.

THE LA GLORIA PEAK,

from which the Indians obtained gold, suspending themselves from above by means of ropes and grappling irons, is about 400 feet long and 300 feet wide, rising to an extreme height of 371 feet above the tunnel level of the Blanca y Colorada. This peak, with the exception of a portion at the southern end, is completely denuded of the porphyry capping. The quartzite, although its bedding planes are obliterated, is much less shattered than in the Blanca y Colorada mine, but is auriferous throughout. Being more exposed to atmospheric influences than at the Blanca y Colorada, the quartzite loses its white color, and is stained by oxide of iron.

As will be seen on reference to the sections, there is here a large quantity of ore in sight. It is a conservative estimate to put it at 1,500,000 tons of milling ore. Twenty-six samples from the mass averaged $8.81 per ton. As the peak has been but superficially explored, never having been drifted into, it is dangerous to regard it as a homogeneous mass. It is to be anticipated that bands or zones of ore of varying value will be encountered.

The mining of this huge peak will be extremely cheap. It can be benched off with a minimum of labor and the ore discharged into shoots leading to the ravine which separates it from the Blanca y Colorada. In fact, it is stated by those who have examined both mines, that the mining of this particular mass will be cheaper than that at the Treadwell mine, Douglass Island, Alaska.

Immediately south of this peak is the Descubridora, and to the east, separated by a narrow ravine, is the Abundancia, both large exposures of quartzite, assaying sometimes $6 to $8 per ton, but unexplored to any extent.

The Restauradora is another exposure. It is situated on the river, over a mile to the northeast of the Blanca y Colorada. On the river this forms a sheer face of quartzite, rising some 300 feet above water. Its surface, however, is partially capped by and partially intermixed with porphyry. The cropping of this body extends 1,500 feet to the southwest, with a width of 100 to 300 feet. The Restauradora was but partially sampled; those samples taken showed good milling ore. It has been thought that there is a continuous body of auriferous quartzite from the Blanca y Colorada to the Restauradora on the river, but overlaid for 4,000 feet of the distance by porphyry. This must remain a matter of opinion until the ground is explored. The drifts furthest northeast in the Blanca y Colorada show that the porphyry walls are approaching each other. The proximate continuation of the quartzite must be sought for in depth.

THE LA DURA

lies fully a mile to the west of the Blanca y Colorada. I was informed that this was another large face of quartzite assaying $6 to $9 per ton. In this neighborhood, however, there is no water. The ore, to be reduced, must be transported nearly three miles to the river.

On the north side of the river is the Refugio mine, a fissure vein, the gangue being sulphate of baryta. At this mine there are a number of arrastres at work. The ore is said to yield $20 per ton. On the Concession there is a silver mine, a galena mine and also a copper mine, from which it was found profitable to ship ore when high prices prevailed in 1864 and 1865. Ore from none of the mines I have mentioned, except the La Gloria and the Blanca y Colorada, has been worked in the mill.

THE MILL

is of 60 stamps, of 650 pounds weight, driven by two 20 H. P. engines. The mortars are of wood, with iron bottoms. Neither quicksilver in the battery nor amalgamation plates have been used. The crushed ore simply passes through sluices in which riffles containing mercury have been placed. The fact that tailings from ore assaying $25 to $30 per ton, crushed through an eight-mesh screen, and amalgamated in this crude way, assayed but $1 to 1.25 per ton, speaks well for the freeness of the ore. The gold is coarse, but bright and quick to amalgamate. The bullion averaged about .938 fine in gold. There is about 1 to 1½ per cent. of sulphurets in the ore, which assay when concentrated, $125 to $135 per ton. These sulphurets were concentrated on convex buddles with a further concentration on the planilla. In the spring of 1888 two classes of ore were milled, one averaging about $22.50 per ton, the other about $10.50. It is safe to say that the ore from the Blanca y Colorada will yield about 90 per cent. of its assay value by free milling, and that from the La Gloria 75 to 80 per cent.

WOOD

is plentiful in the neighborhood of Mulatos. Ten miles distant, both to the east and to the west of Mulatos, at higher elevations, is found sugar pine, which will furnish excellent timber or lumber. In its immediate vicinity there is still enough oak to supply the boilers for some time. Oak wood costs, delivered at the mine, $3.50 gold per cord.

WATER

is not found in the mine, although the creek that supplies the mill flows between La Gloria and the Blanca y Colorada mines. By damming this creek properly water enough to supply a hundred stamp mills could be obtained. The Mulatos River, on which a mill will probably be erected, carries in the dryest season about 3,000 miners' inches of water with a fall of nearly two hundred feet in ten miles. By conducting this water through a ditch or flume, necessarily expensive, owing to the nature of the cañon through which the river passes, enough water could be obtained to furnish power to a mill of large capacity. At the river is distant 1½ miles from the mine and 500 feet lower, this would necessitate transportation of the ore to the water.

A few words as to the method of examination may be of interest. The samples for assay were taken in a thorough manner. Each one represented about 35 lineal feet of the auriferous quartzite, taken, when possible, on cross sections of the workings, to avoid getting any undue proportion of a rich streak by following on them longitudinally, as it was to be presumed that the existing drifts were run on seams of good ore.

Along the length of the ground to be sampled ore was knocked down by pick or hammer to hides held below. The sample was then placed in large sacks of ducking, carefully sealed, and carried to the mill. Here, each sample, weighing on an average above 300 pounds, was crushed through an eight-mesh screen in a five-stamp battery arranged temporarily for dry crushing. After the sample had passed through and the battery had been carefully cleaned out, the fine pulp that adhered to the housing as well as that found inside, was added to the main sample, and the whole carefully mixed and then quartered down. Enough was saved from each sample to make a panning test of 20 pounds, a few pounds for check assays to be made in San Francisco, and about five pounds for assay at the mine.

This last, after careful quartering down, was ground on a bucking plate through a 40-mesh screen; 30 grams were taken for assay, and the resultant gold weighed on a Becker balance capable of weighing $\frac{1}{100}$ of a milligram.

The expedition was concerned only with the pecuniary value of the mine, and all work was confined to that object. The questions of the absence of legal and political drawbacks, the character and availability of labor, questions of supply and cost of freight, and all other items which bear directly on the value of the property as an investment, also occupied the time of the examining engineers. To have mastered the geology of the deposits would have taken a much longer period than the seven weeks devoted to the examination. In the foregoing I have given only my individual opinions.

The mining and reduction of ores in Mexico are sometimes accompanied by conditions and difficulties rarely appreciated by foreign owners. When they are understood, these difficulties can be satisfactorily met, particularly by owners who understand the character of Mexican labor, and who provide against the want of roads and other facilities by keeping a good stock of material on hand. The great resources of the Mulatos property call for a large working capital and extensive milling capacity. An estimate of what might be accomplished with fully equipped works, under intelligent direction, placed the cost of mining, milling and management at not above $3.50 (gold) per ton.

The following statement of cost of mining, milling and management, taken from the pages of the ENGINEERING AND MINING JOURNAL, show, considering the greater size and accessibility of the Mulatos ore bodies, that the foregoing estimate is a conservative one.

Name of Mine.	Fiscal Year.	Cost per ton.
Plymouth Consolidated	1884	$3.89
Homestake	1885	3.03
Caledonia	1886	2.95
"	1887	3.20
"	1888	3.12
"	1889	2.74
Sierra Buttes	1889	3.68
Plumas Eureka	1889	3.98

Under the conditions named above, the Mulatos mine, in my opinion, will become one of the most noted and best paying gold mines in North America.

SAN FRANCISCO, January, 1890.

THE SUBMERGED RAILWAY OF ONTON, ON THE COAST OF SPAIN.

The mines of Onton, near Bilbao, north Spain, have long been celebrated for their richness in the yield of iron ores suitable for the manufacture of steel, but great trouble has heretofore been experienced in the shipment of the mineral on account of the difficulty of placing it on board of the ships. England and the Continent are the great markets for this product. The coast adjacent to these mines is high and rocky, exposed to the full force of the sea, there being no harbors in the immediate vicinity. At the foot of the rocks there is a sloping shore which extends out to a considerable distance, with an even grade. It is upon this incline that the remarkable railway we are about to describe has been constructed.

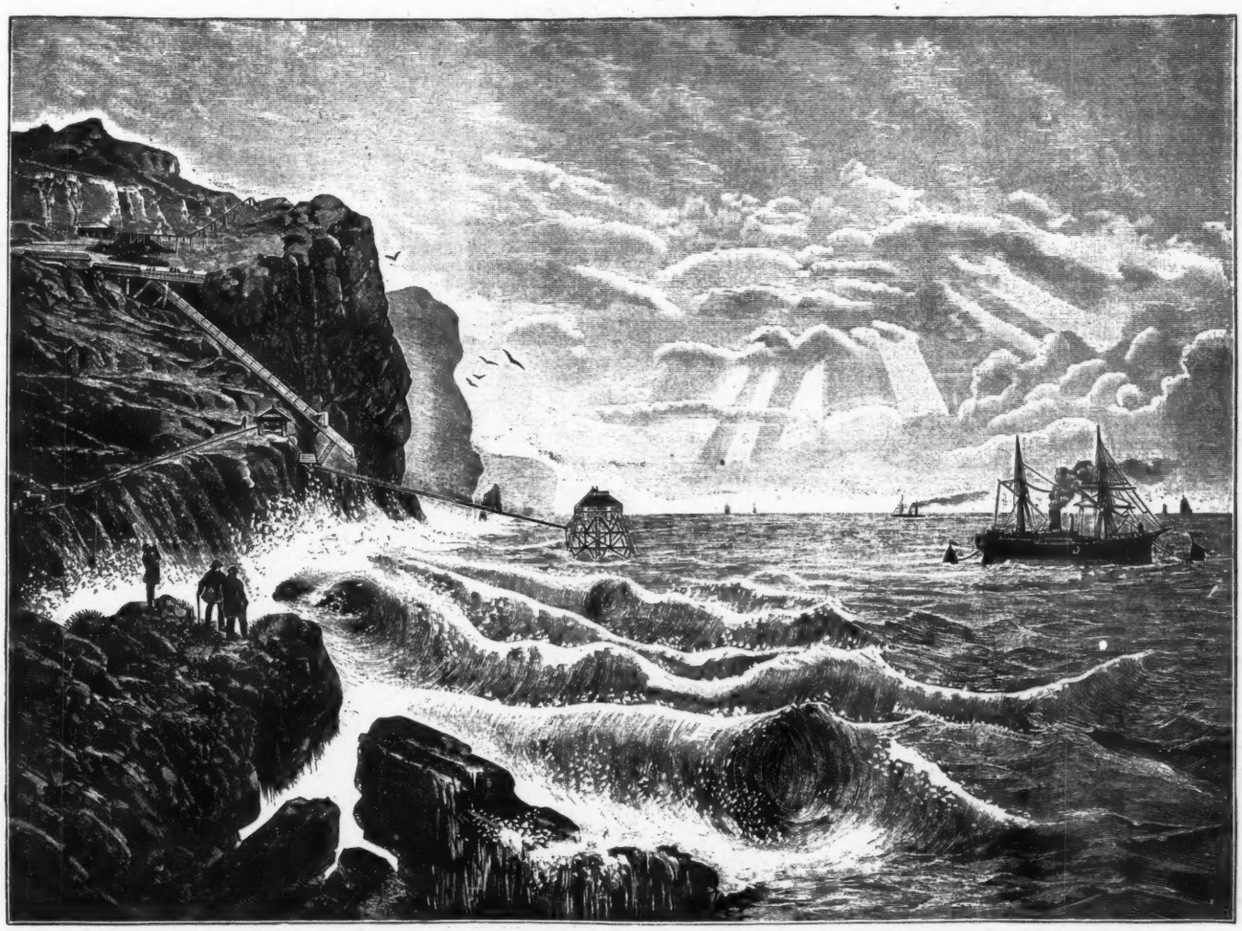
The roadbed of the railway has a length of about 650 feet and a width of 20 feet, upon which two sets of parallel tracks, each 3¼ feet wide, are placed, constituting a four-rail railway. The grade is five feet to the hundred. The car which traverses this railway, and upon which the ore is conveyed from the cliffs to the ships, consists of a high metallic tower made in the form of a pyramid having a wide triangular base. The tower is mounted on wheels, which run upon the quadruple railway track before mentioned. The platform of the tower, upon which the load of mineral is placed, is about 70 feet high from the track, a height which is sufficient to rise above the decks of ordinary vessels when the tower is run alongside thereof; and from the platform the discharge of the ore is made directly into the holds of the vessels. This great rolling tower is operated automatically. It is connected to the shore by means of a strong wire cable, which passes over pulleys fastened to the rocks. At the landward end of the cable there are attached some weighted cars that move up and down upon an incline, as shown in our engraving. These form a counterbalancing weight for pulling the tower when empty in toward the shore.

The mineral to be loaded upon the vessels is brought from the mines, which are not far distant from the coast, upon rope railways mounted upon posts, as seen in our engraving. From the mineral dumps upon the rocky heights the mineral is conveyed part way down the cliff through a chute, the end of which projects beyond the cliff, and when the empty

tower is drawn to shore by the weighted cars before mentioned it automatically opens an end gate in the chute and allows the mineral to drop upon the platform in a continuous stream until a weight of ore sufficient to overcome that of the counterbalancing weight or weighted cars has fallen upon the platform, and when this takes place the tower, by its own gravity, begins to move down the inclined railway, and the gate of the chute automatically closes. The tower continues to glide down the inclined railway through the water, until it reaches the side of the ship, which is anchored fore and aft, and then by the throw of a lever, the platform of the tower being inclined, the whole load upon the platform is almost instantly deposited upon the ship, going down through suitable slides into the hold thereof. As soon as the discharge of the load takes place, the counterbalancing cars begin to draw the tower inward again toward the shore, and thus the operation of moving the tower back and forth automatically, and automatically loading and discharging itself, is carried on with the greatest success.

It is said this railway operates even when the sea is extremely rough. It certainly is a bold undertaking, and reflects the greatest credit upon its constructor, Mr. D. M. Alberto de Palacio. The platform carries for its load 100 tons of ore. It is said that 5,000 tons of ore per day can be put on shipboard by means of this apparatus, the total cost of which was only $18,000.

[We are indebted to the *Scientific American* for the foregoing description, the illustration being borrowed from *La Ilustracion Espanola*.—ED. E. & M. J.]



SUBMERGED RAILWAY FOR LOADING ORE NEAR BILBAO.

FERRO-CHROME.*

By M. A. Brustlein,
Engineer in charge of the works of Jacob Holtzer & Co., at Uineux, department of Loire, France.

Alloys of iron and chromium, containing more or less carbon, have long been known as laboratory products. Berthier makes mention of chrome steels in his memoir published in 1820, and laid stress on the method of making ferro-chrome, predicting that it would be used to introduce chromium in cast steel.

Later, Boussingault devoted some attention to this subject, and especially showed the presence of three to four per cent. of chromium in the castings made prior to 1867 in the neighborhood of Medellin, in the province of Antioquia, South America.

It was first in the United States that these steels were produced to any extent for industrial purposes. In 1875, on beginning my tests at the Holtzer works, I had read that chrome steels of great resistance had been made in Brooklyn. Mr. Rolland, mining engineer, published in 1878 a report on its manufacture as conducted in Brooklyn. In consequence of our tests, we began in 1877 to deliver chrome steel to our clients, and since that time the consumption has grown more and more extended. Owing to the results obtained by us, other steel works entered into the same field; but we were certainly the first in Europe to make this product industrially. Thus we have created a new division of our industry; and the exploiting of this branch has been profitable to most of the large works in our territory.

During the first years of our experience, rich chrome iron did not exist; indeed, we were obliged to make them ourselves in crucibles. Later they were produced in high furnaces and small blast furnaces, having a richness of 60 per cent. of chromium and sometimes even more. In order to obtain products of greater richness it is necessary to use pure sesquioxides of chromium, which are expensive, besides with such proportions of chromium the metal fuses with too great difficulty to be treated in industrial work.

We have collected a series of samples of chromes and ferro-chromes, of which we give herewith the description:

Sample bar No. 2, obtained by reducing sesquioxide of chromium, without excess of carbon in a magnesia crucible. Chromium, 84 per cent.: carbon, 9 per cent.

The bar contains holes, the presence of carbon tending to show that the reduction had not been completed.

Sample bar No. 6, obtained by reducing sesquioxide of chromium in a graphite crucible. Chromium, 82 per cent.; carbon, 7·5 per cent.; silicon, 8·2 per cent.

Sample bar No. 1, obtained by reducing sesquioxide of chromium in a brasqued crucible. Chromium, 80 per cent.; carbon, 11 per cent.

Sample bar No. 3, of rich ferro-chrome, containing very little carbon. Chromium, 71·5 per cent.; carbon, 3·46 per cent.; iron, 20 to 25 per cent.

No. 4. Ferro-chrome, cast in the crucible furnace of the works. Chromium, 60 per cent.; carbon, 8·6 per cent.

No. 5. Ferro-chrome, poured in chill for ordinary use. Chromium, 50 per cent.; carbon, 8 per cent.

No. 7 and No. 8. Silico-ferro chrome, No. 7 cooled slowly and No. 8 poured in chill. Chromium, 30 per cent.; silicon, 8 per cent.; carbon, 5 per cent.

No. 9. Poured in chill. Chronium, 42 per cent.; carbon, 7·3 per cent.; silicon, 2·1 per cent.; manganese, 0.4 per cent. This specimen serves to show the special shiny fracture of the metal.

Nos. 10 and 11. These two specimens have the same richness in chromium, but differ in the contents of carbon. No. 10. Chromium, 30; carbon to saturation. No. 11. Chromium, 30, carbon, 4.7 per cent.

Nos. 12 and 13 do not differ except that No. 12 cooled slowly and that No. 13 was poured in chill. Chromium, 25 per cent.; carbon, 30 per cent. In No. 12 white needles are detached in a very apparent fashion on a gray casting. I estimate that there is not enough carbon to saturate all of the mass and that the white needles are formed at first and more carbonized than in the cast.

* A paper presented before the International Congress of Mines and Metallurgy held in Paris.

Nos. 14, 15 and 16. These three numbers have the same contents of chromium, 15 to 16 per cent., but No. 14 is saturated with carbon, while Nos. 15 and 16 do not contain more than 2 to 3 per cent. No. 15 is cooled slowly, and No. 16 is poured in chill.

No. 17, 18, 19 and 20. These four numbers have the same contents of chromium; that is, 12 per cent. No. 17 is saturated with carbon, while the three following numbers only contain 2 per cent. No. 18 is cooled slowly, while No. 19 is poured in chill, and No. 20 is the same as No. 19 drawn out in bars. This shows that a metal with 12 per cent. of chromium and 2 per cent. of carbon may be forged if one operates with precaution and is found on the line of separation between the steel and the casting.

Nos. 21, 22, and 23. These three samples all contain about 7 per cent. of chromium. No. 22 only contains 1·25 per cent. of carbon. Nos. 21 and 23 have the following composition:

	No. 21.	No. 23.
Chromium, about	7·	7·
Carbon	5·	4·5
Silicon	0·4	0·25
Manganese	0·38	0·36

From the foregoing it appears that the chromes and the ferro-chromes may be combined with large proportions of carbon, much greater than those that are found in ferromanganese. The appearance of the fracture of ferro-chromes differs more according to their contents of carbon and silicon than with their contents of chromium. Also, it is very difficult to determine at sight the proportion of chromium of a ferro-chrome saturated with carbon or with carbon and silicon. When they are strongly charged with carbon, or with carbon and silicon, they always have a tendency toward having an acicular structure, and are always hard and brittle. But as the proportion of these two metalloids diminishes the hardness and brittleness of the alloys grow less. Thus No. 3, containing 71·5 per cent. of chromium, is less brittle than the adjoining specimens. It has a bluish tint, scratches glass more easily than its neighbors, and the fracture shows small faces, and is not acicular. It is very strongly attracted by the magnet, whereas the preceding specimens are not sensibly affected. It is therefore principally the carbon and silicon that influence the action of the magnet.

With a composition of 16 per cent. of chromium and of 2·7 of carbon, such as No. 15, the acicular crystalline form is replaced by small, rectangular cleavages or small faces arranged in steps, giving to the fracture a chatoyant effect, which varies according to the angle from which it is examined.

We know that rich ferro-manganese that has been allowed to cool slowly shows on shrinkage needles similar to those of ferro-chrome, and in manganese castings, it is not until their contents in manganese falls below 10 per cent. that these large specular faces appear, which have been given the name of spiegel. It would be of interest to ascertain whether poor ferro-chrome which is saturated with carbon would possess this peculiarity of imparting to its fracture these large specular faces.

It was especially for this purpose that in preparing samples I made those containing so small a proportion of chromium.

Thus no 21 shows no such faces, while in no 23 the peculiar crystallization of spiegel, but of spiegel with faces slightly straited, is very greatly developed. These two samples only differ by the proportion of carbon and silicon that they contain; therefore we are tempted to attribute to the influence of silicon the absence of faces in No. 21. Nevertheless it will require a great number of trials in order to draw a conclusion.

Besides, the question appears to be of interest from the following point of view:

Steel only differs from cast iron by a small proportion of bodies foreign to iron; hence it is natural that these bodies should possess in themselves certain properties which they impart to steel having an analogous relation to those which they give to cast iron.

Thus we see that manganese united to carbon produces in cast iron those enormous cleavages which distinguish the spiegel and remove all solidity from the metal; and hence we should fear that, in a carbonized steel, the manganese favoring the crystalline development, would injure, for that reason, the solidity of the metal, which, in reality, does take place. The same observation applies to silicon, but in an inverse sense; that is to say, by preventing the crystalline development. For ferro-chromes the tendency of chromium to give the specular aspect to cast iron is slight—in any case, less than in the manganese—which makes it possible to prevent this metal from having the same objectionable features that the manganese does.

Experience goes to prove this condition of affairs. There may be introduced varying proportions of chromium, of which the effect is to increase the resistance of steel without diminishing the tenacity corresponding to its carbon contents, and even, it appears, to slightly increase that tenacity. In consequence it is possible to obtain, with a resistance given to the rupture, a bending corresponding to that which is obtained with a steel that is ordinarily less resisting or softer; that is to say, in describing it, as a metal which, well handled, offers a very great security.

At the forge an ingot of chrome steel may be worked with no more difficulty than with ordinary steel of the same hardness; nevertheless when hot it offers a greater resistance to deformation. When an ingot is cut hot by a cutter the metal is more ductile; the point of contact between the two pieces is flattened out into a thin web before breaking. It is influenced by the fire even less than an ordinary steel of the same hardness.

In the cold, when worked on a lathe or with a plane, a steel containing, for instance, two per cent. of chronium, is always a little softer to cut than ordinary steel; nevertheless, if it is properly reheated the difference is not great. Steel that contains less chromium, even when it has one per cent. carbon, may be worked without difficulty on a lathe. Tempered with oil or with water, the temper penetrates more deeply than in a carbonized steel of the same degree of carbonization without chromium.

The particulars which present themselves during the heating and cooling, during the passage of carbon, from the combined state to the dissolved state, have been studied by M. Osmond, who compared it with other steels in his interesting researches on this subject.

To continue, chrome steels offer a resistance to shock and to fracture which for the time being have the preference for a certain number of uses. On the other hand, when once made into ingots, it can be manipulated like ordinary steel, which is an additional advantage. But they offer in their manufacture difficulties of a special nature. In a state of fusion which takes place at high temperatures, the chromium which it contains has a tendency to take up oxygen from the air. For in such case there is not formed, as is the case with oxide of manganese, a liquid and fusible silicate lighter than steel which comes rapidly to the surface. It would be supposed that there would be a tendency to form a chromite of iron; in any case, chromium, in burning, causes in its immediate neighborhood the decarbonization of the steel and the oxidation of the iron, giving rise to a creamy layer, of which the little fragments rest readily not only on the edges of casting pot, but even in the mass of the metal. This effect is heightened when the contents of chromium is greater, and when the steel itself is poorer in carbon. The portions thus oxidized will not unite under any working, no matter to what temperature they may be heated.

For the same reason the layer of oxide which is formed on heating the ingots or bars is stronger and adheres closer than in ordinary steel, and does not easily dissolve in borax. Also chrome steels only unite with difficulty or not all, according to amount of chromium they contain. Hence it is assumed that a metal containing much chromium is undesirable for puddling. As a matter of fact, every lump of refined metal that is made becomes surrounded with an oxidized pellicle, which adheres to it and is in consequence insoluble, so that under a shingling hammer it is impossible to collect these lumps in a proper and coherent mass.

Although we have not tried it, we are persuaded that every attempt at puddling will encounter the difficulty that we have described. Ferro-chromes are as a usual thing very strongly carbonized, and hence it seems natural to consider their use in place of ferro-manganese for the purpose of recarbonizing steel at the close of either a Bessemer or Martin operation. It will be necessary in this case to keep account of the difficulties which will be the consequence of the properties which we have described.

We regard it as very difficult to produce an extra soft steel containing much chromium, for instance a metal that when cast will contain from one to two per cent. of chromium and one or two thousandths of carbon. Judging by analogy, a metal of this composition if it is clear and sound will have a remarkable ductility.

There is with this production a double difficulty. First, the ferro-chrome which is made is always very rich in carbon, and an alloy but little carbonized is no longer fusible at industrial temperatures and is readily oxidizable. In the second place, the steel obtained at the state of fusion becomes filled with scoria and veins on cooling.

For these very reasons chrome steel will require most delicate treatment, and it will be exceedingly difficult to use it in the manufacture of sheeting, especially mixed or compound sheeting.

OUR PRODUCTION OF PIG IRON IN 1889.

We make the following extracts from the valuable tables compiled by Mr. James M. Swank, from the returns furnished by manufacturers of the amount of pig iron made and stocks in hand.

The total production of pig iron in the United States in 1889 was 7,604,525 gross tons, against 6,489,738 gross tons in 1888, an increase of 1,114,787 gross tons, or over 17 per cent. Reducing gross to net tons, our production in 1889 was 8,517,068 net tons, against 7,268,507 net tons in 1888. When it is remembered that our production in 1888 was the largest in our history down to that time the magnitude of our production in 1889 will be more fully comprehended.

TOTAL PRODUCTION OF PIG IRON.

STATES.	Blast Furnaces. In blast June 30, '89	Dec. 31, 1889. In	Out	Total	Production. Tons of 2,000 lbs. (Includes spiegeleisen.) First half of 1889.	Second half of 1889.	Total for 1889.
Maine	1	1	...	1	2,700	2,500	5,200
Massachusetts	2	2	2	4	2,651	5,100	7,751
Connecticut	5	5	3	8	15,108	12,035	24,143
New York	14	18	21	39	144,613	152,634	297,247
New Jersey	7	8	10	18	67,749	57,944	125,993
Pennsylvania	123	151	77	228	2,013,804	2,167,438	4,181,242
Maryland	2	4	11	15	10,233	23,614	33,847
Virginia	13	15	17	32	112,328	139,028	251,356
North Carolina	1	1	1	2	922	1,976	2,898
Georgia	1	1	4	5	11,338	16,221	27,559
Alabama	29	33	12	45	364,346	427,079	791,425
Texas	1	....	1	1	1,411	3,133	4,544
West Virginia	3	3	3	6	72,775	45,125	117,900
Kentucky	4	5	2	7	23,865	18,653	42,518
Tennessee	12	14	5	19	147,401	147,254	294,655
Ohio	40	49	25	74	595,561	620,011	1,215,572
Indiana	.....	1	1	2	7,806	2,033	9,859
Illinois	9	10	6	16	282,153	319,871	602,024
Michigan	9	10	16	26	100,363	113,993	214,356
Wisconsin	5	8	2	10	74,065	84,569	158,634
Missouri	4	4	4	8	42,795	43,395	86,190
Colorado	.....	1	1	2	.....	2,678	2,678
Oregon	1	...	1	1	5,426	4,000	9,426
Washington	1	....	1	1	5,571	4,800	10,371
Total, 1889	287	344	226	570	4,101,984	4,415,084	8,517,068
Total, 1888	290	332	257	589	3,382,503	3,886,004	7,268,507

PRODUCTION IN 1889 ACCORDING TO FUEL USED.

FUEL USED.	Blast Furnaces. In blast June 30, 89.	Dec. 31, 1889. In	Out	Total	Production. Tons of 2.000 lbs. (Includes spiegeleisen.) First half of 1889.	Second half of 1889.	Total for 1889.
Anthracite	79	104	78	182	918,611	1,001,743	1,920,354
Charcoal	63	63	80	143	306,780	337,520	644,300
Bituminous	145	177	68	245	2,876,593	3,075,821	5,952,414

TOTAL STOCKS OF UNSOLD PIG IRON.

States.	Tons of 2,000 pounds.			
	Dec. 31, 1887.	Dec. 31, 1888.	June 30, 1889.	Dec. 31, 1889.
New England	7,930	11,266	19,347	19,897
New York	35,019	31,224	58,169	42,607
New Jersey	22,211	23,817	27,552	5,800
Pennsylvania	154,175	109.003	195,931	67,905
Maryland	1,167	1,900	2,218	1,372
Va., N. C., Ga. and Texas	6,848	18,913	30,662	8,130
Alabama	14,248	23,851	36,449	39,916
West Virginia	4,835	400	3.217	
Kentucky	4,324	8,970	8,050	5,382
Tennessee	7,726	8,282	17,565	7.982
Ohio	33,007	37,103	70,909	27,579
Michigan and Indiana	39,319	39,886	37,257	25,102
Illinois				
Wisconsin	845	7,163	17,365	9,428
Missouri and Colorado	5,329	11,701	33,438	8,981
Pacific States	1,159	2,682	5,157	8,220
Total	338,142	336,161	563,286	277,401

STOCKS ACCORDING TO FUEL USED.

Bituminous	127,978	118,261	247,564	86,772
Anthracite	114,107	106,529	165,334	77,502
Charcoal	96,057	111,371	150,388	113,127

PRODUCTION OF BESSEMER PIG IRON IN 1889.

New York	29,233	47,714	76.947
New Jersey	13,946	10.058	24,004
Pennsylvania	990,239	1,226,709	2,216,948
Maryland		14,478	14,478
West Virginia	63,042	43,745	106,787
Tennessee			
Ohio	200,492	252.154	452,646
Illinois	247,101	297.864	544,965
Missouri	37,080	36.765	73,845
Wisconsin	1,625	16,072	17,697
Colorado		1,267	1,267
Total	1,582,758	1,946,826	3,529,584

The enormous production of 1889 was better distributed throughout the year than the public has been erroneously led to believe. The production of the first half of 1889 was 3,662,486 gross tons, and the production of the second half was 3,942,039 gross tons, an increase in the last half of 279,553 gross tons. The increased production in the second half of 1889 was wholly due to the increased demand for Bessemer pig iron.

The stocks of pig iron which were unsold in the hands of makers or their agents on the 31st of December last, and which were not intended for the consumption of the manufacturers, amounted to only 277,401 net tons, against 336,161 net tons at the close of 1888. There was, however, an increase in stocks during the first half of 1889, the figures on the 30th of June amounting to 563,286 net tons. There was, therefore, a considerable decrease in stocks in the last half of the year. In addition to the stocks above noted, the American Pig Iron Storage Warrant Company advises us that at the close of 1889 there were 36,200 gross tons, or 40,544 net tons, of pig iron in its warrant yards.

The production of pig iron in 1889, according to the fuel used, was as follows, compared with the production of the two preceding years:

Fuel—Net tons.	1887.	1888.	1889.
Bituminous	4,270,635	4,743,989	5,952,414
Anthracite and coke	1,919,640	1,648,214	1,575,996
Anthracite alone	418,749	277,515	341,358
Charcoal	578,182	598,789	644,300

Nearly all the leading pig iron producing States shared in the increased production of 1889 over 1888. Pennsylvania shows the largest actual gain, with Alabama next, Pennsylvania's increase over 1888 being 592,056 net tons and Alabama's 341,933 tons. The great progress made by the entire South in the production of pig iron in the last four years is shown in the following table:

States—Net tons.	1886.	1887.	1888.	1889.
Alabama	283,859	292,762	449,492	791,425
Tennessee	199,166	250,344	267,931	294,655
Virginia	156,250	175,715	197,396	251,356
West Virginia	98,618	82,311	95,259	117,900
Kentucky	54,844	41,907	56,790	42,518
Georgia	46,490	40,947	39,397	27,559
Maryland	30,502	37,427	17,606	33,847
Texas	3,250	4,383	6,587	4,544
North Carolina	2,200	3,640	2,400	2,898
Total	875,179	929,436	1,132,858	1,566,702

There has been a gratifying increase in the production of spiegeleisen in 1889, the production being 86,812 net tons against 54,769 tons in 1888.

Much has recently been written about the possibility of our overtaking Great Britain in 1890 in the production of pig iron. It has been assumed that we would certainly do this; indeed, that we are *now* producing at a more rapid rate than the mother country. The following comparative figures will throw some light on this subject:

Years—Gross tons.	Great Britain.	United States.
1882	8,586,680	4,623,323
1883	8,529,300	4,595,510
1884	7,811,727	4,097,868
1885	7,415,469	4,044,526
1886	7,009,754	5,683,329
1887	7,559,518	6,417,148
1888	7,998,969	6,489,738
1889 (estimated for Great Britain)	8,300,000	7,604,525

We do not think that we will pass Great Britain in 1890 if trade conditions in both countries should continue as they now are. In 1889 we exceeded her production in 1887.

THE QUICKSILVER MINING COMPANY, NEW ALMADEN, CALIFORNIA.

We have received, through the courtesy of Mr. J. B. Randol, a statement of the earnings, expenses, profits and dividends of the Quicksilver Mining Company for 19 years ending December 31st, 1889, being the period during which the management of the company has been in the hands of Mr. Randol.

EARNINGS.

Quicksilver produced, 368,922 flasks, average value per flask, $35.75		$13,188,112.32
Miscellaneous		721,752.67
		$13,909,864.99

OPERATING EXPENSES.

Pay rolls	$6,137,921.24	
Miscellaneous and taxes	848,593.01	
Materials consumed in operation of mines and furnaces	1,974,357.62	
		8,960,871.87
Ballance		$4,948,993.12

This balance is accounted for as follows: $897,500.26 have been expended for improvements; furnaces and condensers, $299,499.96; hoisting works, machinery, pumps and shafts, $442,681.37; houses, sheds and shops, $86,308.32; flumes, water works, roads and other surface improvements, $69,010.61; total, $897,500.26; add, disbursements not charged to operating expenses, real estate purchased, $14,500; legal expenses and patents, $42,349.42; black debt of 1870, $9,342.68; less land sold, $1,687.70; total, $64,504.40.

Profits expended in California		$962,004.66
Accounted for by increase in personal property accounts.		126,057.85
Total profits accounted for in California		$1,088,062.51
Profits remitted to New York office		$3,860,930.61
Total profits accounted for		$4,948,993.12
Funded debt and dividends paid in New York	$3,163,963.80	
Interest on funded debt, taxes, expenses and assets in New York	696,966.81	
		$3,860,930.61

The company is entirely free from debt.

PRINCIPAL OF FUNDED DEBT AND DIVIDENDS PAID IN NEW YORK.

First mortgage gold bonds, paid June 1st, 1873, $500,000; second mortgage gold bonds, paid July 1st, 1879, $1,000,000; total, $1,500.000.

Dividends.—1881—$9 25 on 42,913 shares preferred stock; $2.25 on 57,087 shares common stock—$525,391. 1882—$6 on preferred stock; 40c. on common stock—$280,312.80. 1884—$3 on preferred stock, $128,739; 1886—$2.75 on preferred stock, $118,010.75; 1887—$3 on preferred stock, $128,739; 1888—$6.75 on preferred stock, $289,662.75; 1889—$4.50 on preferred stock, $193,108.50; total dividends, $1,663,963.80; total capital and dividend disbursements in New York, $3,163,963.80. In hand dividend $1.50 on preferred stock, payable February 1st, 1890, $64.369.50.

THE MOUNT MORGAN MINE, QUEENSLAND, AUSTRALIA.

(Special Correspondence of the Engineering and Mining Journal.)

One million one hundred thousand dollars sterling, equal to $5,500,000, paid in dividends in *one year*.

The report of the directors of the above mine states that the expenditure has been £227,769. Dividends as above have been paid, and £23,573 is carried forward.

The mine has produced 323,542 ounces of gold, for which £1,331,484 18s. 5d. was received. The shares during the year fluctuated from £15 to £6 7s. which is the present quotation, December 17th.

The directors are establishing a London board, which in some measure will prevent the fluctuations in the price of shares that have taken place during the past year.

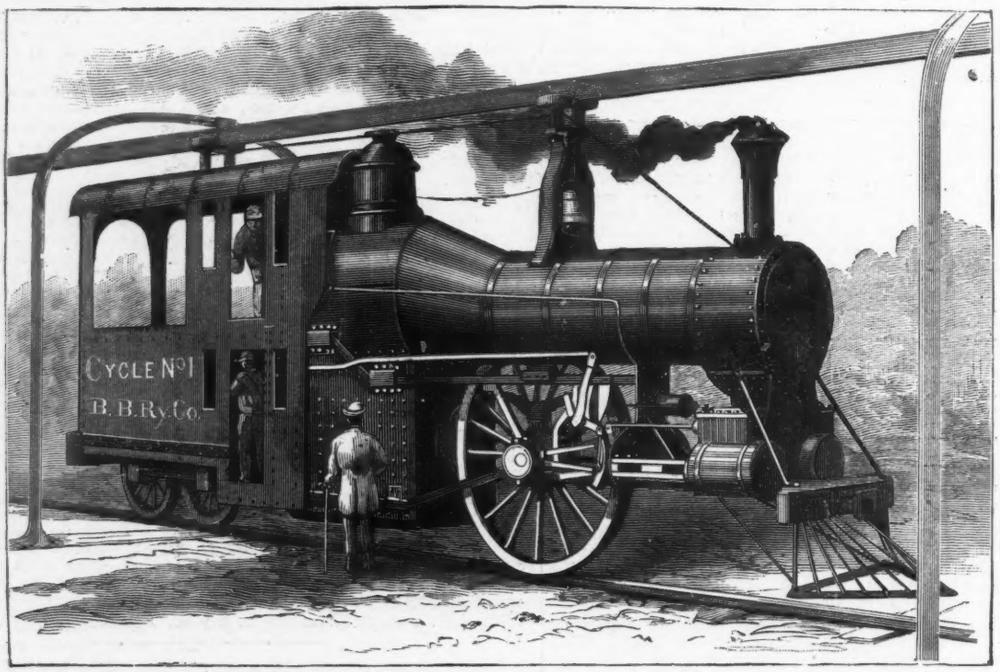
GENERAL MANAGER'S REPORT.

The general manager's report states: "I have to report for the year ending November 30th, that we have kept the whole of the reduction works constantly running, and without taking into consideration the quantity of old tailings treated, we have raised, crushed, and treated by chlorination 75,415 tons of raw stone, and returned 323,542 ounces of gold, equal to four ounces, six pennyweights, four grains per ton, for the total amount of stone raised. I much regret not being able to complete the year by raising in November sufficient stuff for the usual dividend, but shareholders must bear in mind that Mount Morgan is only a gold mine wonderfully rich in patches, but subject to vicissitudes common to all mineral formations. The very rich patch of golden stone cut out very unexpectedly in July last. I thought we should find it again under the ironstone in the magazine face; but in these expectations I was disappointed. Instead of gold following down the dyke on the southern side of the mountain it shot off to the northern side, and we had to drive 200 feet through the mountain before we came to the Lady Musgrave lode. This body of stone is 84 feet wide, with a back of 47 feet, and opens out a new feature in Mount Morgan. It carries an average of 5 ounces of gold to the ton. We are now opening a big fall on it, and, judging from the outcrop of auriferous ironstone, the belt of golden stone extends about 250 feet east and west. We have the freehold tunnel running nearly east and west. In driving the freehold tunnel we passed through 70 feet payable stone, averaging 2 ounces 19 pennyweights of gold to the ton, and we have, since my last report, driven south along gold bearing stone 172 feet. At 134 feet south of the freehold tunnel we have again driven east and west and proved the gold bearing stone at this point to be 105 feet wide, thus proving that the golden stone of Mount Morgan does go down. We are also carrying in the sunbeam tunnel; it is coming in from the west side of the mountain, and it is now driven 753 feet, and will strike the main pass 89 feet below the level of the freehold tunnel. I have also started a tunnel on the southeast side of the mountain. This will strike the Lady Musgrave reef 85 feet below crosscut in the freehold tunnel. Should we strike the gold at this depth, even if it only averages two ounces to the ton, there will be

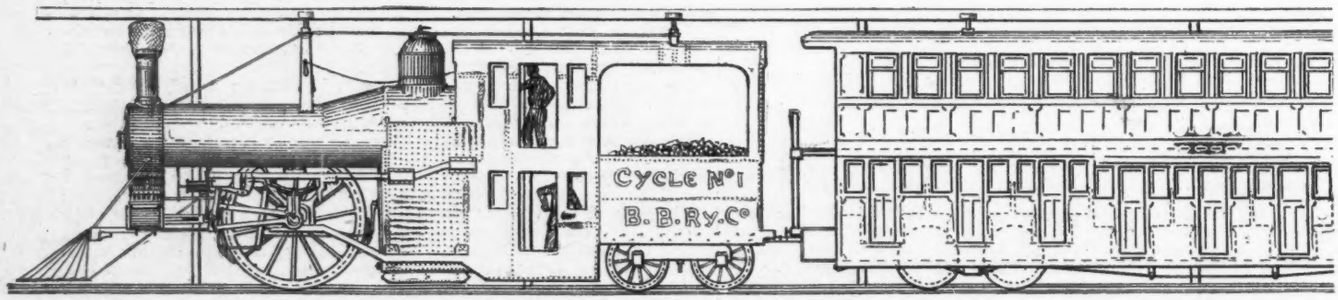
a great future for Mount Morgan, which will probably warrant an extension of the reduction works. An addition to the works opens up the very grave question of fuel. We have increased our stock of firewood by about 20,000 tons, but 4,000 tons per month will soon exhaust the bush around Mount Morgan. The question of railway communication is becoming every day of more vital importance. If the government will not make a railway, the company must do so, if it is possible to get the sanction of Parliament."

BOYNTON BICYCLE RAILWAY SYSTEM.

The discussion of the Rapid Transit bills for the city of New York brings prominently forward the claims of Mr. E. M. Boynton to have solved the problem by means of his system and entitles him to an impartial hearing in support of them. We take this opportunity of illustrating and describing the device, which, in the opinion of Patent Examiner B. W. Pond, presents a practical solution of the problem of increased rate of speed as of an increase of the rates of paying to non-paying load, whether in freight or passenger traffic.



BOYNTON BICYCLE LOCOMOTIVE FIG. 1.



BOYNTON ENGINE NO. 1 AND TWO-STORY PASSENGER CAR. FIG. 2.

Fig. No. 2 represents engine No. 1 and two-story coach, weighing five tons, and carrying 108 passengers. Weight, 22 tons; diameter of driver, 8 feet; working pressure of boiler, 150 pounds to square inch; two cylinders, 12x14 inches; average stroke, high pressure, 500 revolutions per minute; speed with four cars, weighing 20 tons, seating 352 passengers, claimed to be 100 miles per hour.

In Fig. No. 1 is seen Boynton Bicycle Engine No. 1, on a larger scale, from a photograph.

This system will double track the continent without purchasing any additional steel rails, making a double track of each road of the standard gauge of 4 feet 11½ inches, from center to center, leaving about 1 foot between the trains and 15 feet in the clear between the upper wooden guiding beams and the track below. This space permits the present cars and engines to run without interfering with the skeleton frame which, like a bridge, arches it. The two-story passenger cars are 14 feet in height, 44 feet in length, weigh 5 tons, carry 108 passengers each. The freight cars are 14 feet depth, 32 feet long, 4 feet wide, weight 6 tons, are of steel, and their capacity is 40 tons of coal or grain and are self-dumping, receive their load through the roof at the top and dump through valves at the bottom.

Compared with the accommodation of the existing elevated roads, the following comparison is made:

The Boynton bicycle cars are shaped like a wide plank, turned edgewise, are manifold in strength and capacity, and having two stories, with eighteen compartments of six seats, each car weighing but five tons, seats 108 passengers, and running on but one rail enables two trains containing 864 passengers to occupy the space of four cars of the present elevated that only seat 192. The present elevated cars weigh 12¼ tons for 48 seats, the proposed cars five tons for 108 seats. The present engines weigh 23 tons, the proposed engines 12 tons. The present cars are reached by one landing, and have but two doors; the Boynton cars have 18 doors and two landings.

The present cars occupy the street space available, and can never afford other than local accommodation and twelve-mile-an-hour trains. The Boynton cars run on one rail of their roads without any change of gauge, will make their two roads into four roads, two of which, being express, will permit a speed and carrying capacity more than fivefold. The ability to run from Wall to Fifty-ninth street in five minutes, and to Harlem in ten, would be an inestimable boon. It is claimed that in six months the equipment of the Second, Third, Sixth and Ninth avenues can be accomplished.

The Boynton Bicycle plans and specifications thus described are not theories, but facts, for they are simply a copy of the cars and engines now running. A long double-end bicycle engine can be furnished that will distribute the weight on two posts of elevated road.

MINING AND ENGINEERING IN BRAZIL.

The following circular, recently addressed by the Brazilian Secretary of Agriculture and Public Works to the presidents of the several provinces of Brazil, shows the condition of mining industries in the Brazilian Empire, and the kind of encouragement the government offers them:

"The greater part or almost all the concessions made for a great many years for the discovery and working of mines has yielded only barren results for the more or less energetic efforts of the concessionaires, while a large number of them have, after their first efforts, entirely abandoned their works, and allowed their concessions to lapse. This state of affairs has existed for a long time, and the decadence of our mining industries is notorious, although the variety and abundance of mining wealth so patent in various parts of the empire promise and warrant the development of this branch of our national industry which must lead to private and public fortune.

"It is not within the sphere of administrative action to remove at once the difficulties which beset the progress of mining industry, among which

are the lack of economic means of transportation, the scarcity of laborers skilled in these industrial branches, and, as a natural consequence, the hesitation of capitalists whom the failure of so many concessions seems to alarm only the more. But all in the power of the government will be done to at least lessen the obstacles that beset individual efforts, and to stimulate an enterprising spirit.

"With this communication, which you will have published for the purpose of encouraging those inclined to carry on such work, I declare revoked circular No. 87 of October 20th, 1887, and that the government will not only concede whatever time is necessary for the discovery and characterization of mines, but will, according to local conditions, distances, etc., and for the purpose of securing the remuneration of capital by the permanency of work and the certainty of results, authorize each concessionaire to work as many claims (datas) as necessary. In this the concessionaires will not be confined to the small and circumscribed area of a single claim (data mineral) which often affords insufficient room for useful activity.

"To this end you will take especial pains to inform me regarding such term and such number of claims as may seem advisable in view of local conditions, and taking into account the situation of the deposits, their distance from the nearest settlements, means of communication, either existing or projected."

The following letter to the engineers in charge of the various government works and departments under his charge was also addressed by the Minister of Public Works:

"SIR: The no small number of important works that we owe to the skill of Brazilian engineers, the calls that have been made upon them for industrial enterprises in foreign countries, and other unquestionable appreciation of the aptitude of this class, to which is doubtless reserved the most active rôle in the material development of Brazil, all bear witness to the advancement and competency of our national engineeing, and should, and do, inspire in the government the liveliest and t.e profoundest satisfaction.

At the same time, though represented by special and valuable reviews, the intelligent classes have no publication in which the results of these studies, observations and activities are stated in such a manner as to make them known. Useful lessons of experience thus remain fruitless, when they might, if properly published, be productive of knowledge, especially in the sphere of practical appliances. Thus we possess engineering works of which, aside from their importance, whether considered alone, with reference to the difficulties overcome, or in regard to innovations introduced, we have no statements which give correct ideas of them, studying them in their different aspects, and thereby exposing them to the judicious criticism of competent persons.

Convinced that such publicity, so widely practiced in other countries, while it would be an honor to Brazilian engineering, will be a stimulant to its zeal and a source of precious information, I desire that the many engineers in the service of the departments in my charge take this matter into due consideration, giving news to the above mentioned reviews of such works as they direct or are employed upon and as may be worthy of mention, or, if they prefer, that they send me these statements, memoranda or reports, that they may be properly published.

"Without in any way restricting perfect liberty of action or the choice of plan that may seem best, I will suggest that in such works, the study of material used, and especially of national material considered with reference to cost, resistance, durability, etc., should receive especial attention.

"This co-operation which I expect of you and your assistants, and which otherwise is not subordinated to conditions of time, and makes no new duties in connection with the works in your charge, will be considered by the government as a proof of your zeal and dedication to the public cause."

QUICKSILVER DEPOSITS OF THE PACIFIC COAST.

The United States Geological Survey has recently published monograph XIII. on the Geology of the Pacific Coast, by Mr. George F. Becker. This is a quarto volume of 486 pages and is accompanied by an atlas of 14 sheets. It is gotten up in the usual luxurious style of the survey monographs and the atlas plates are very handsome indeed.

Mr. Becker and his party occupied three seasons, beginning in 1883, in the field work on which the present report is based. The investigation has been the most detailed of any yet made on the American quicksilver deposits, and for comparison some of the more important European mines were visited and examined.

The scope of the work has been almost altogether limited to the geological, chemico-geological, and lithological points involved. It is to be regretted that the technical matters connected with the prospecting for, mining and reduction of, quicksilver ores have not been treated, though in regard to the metallurgy of the metal we fortunately have Prof. S. B. Christy's excellent memoir.

In the determination of the geological age of the coast range and in his interpretation of the genesis of cinnabar ores, Mr. Becker takes ground at variance with Whitney and other geologists who have preceded him. The controversy about the geology of the portions of California related to the quicksilver districts is still an open one, and Mr. Becker's conclusions will probably be questioned and discussed by students in the same field. These differences do not, however, immediately concern the miner, and we will leave them to the geologists to settle. But, in the economic direction, Mr. Becker raises a point in his first chapter which will cause some astonishment among mining men. In brief, it is an attempt to deduce the probable amount of quicksilver in the earth's crust, as compared with other valuable metals, from the relative price, cost of production and quantity produced, the conclusion being that quicksilver must be three or four times as abundant as silver, for example. We have not space to quote Mr. Becker's argument in full, and of course this bald statement is not entirely fair to him. But we cannot see the force of the reasoning. Quicksilver deposits are far less numerous than occurrences of silver (of which latter metal it is very probable that enormous quantities are held in solution in sea water, to say nothing of the known ore deposits and associations with lead and copper ores). And if we compare it with gold, the facts are even more against the theory, for gold occurs in all, or nearly all, quartz, whether in veins, gravel or sand, and in great masses of eruptive, metamorphic and sedimentary rocks, though not in such concentrated form as to be available for mining. So also comparisons with many other metals of similarly wide distribution would be misleading. It so happens that cinnabar, metacinnabar, native mercury, etc., when found at all, are usually found in a relatively more bunched condition—that is, more favorably placed for the miner.

Nor can we agree with Mr. Becker in the broad assertion that the price of a metal is only slightly in excess of its average cost of production. The author assumes a ratio of 100 to 90. Following this comparison out, it would, therefore, appear that the quicksilver which sold at $1.50 must have cost $1.35 per pound to produce; that at $1 would have cost 90 cents; and that at 40 cents 36 cents only. This is manifestly not the case. The quicksilver market is peculiar in being one of limited and widely fluctuating demand, depending mainly on the amount which can be absorbed in amalgamating gold and silver, and in vermilion-making. It is also affected by the policy of foreign monopolies. If quicksilver were a metal of almost universal application, with a practically unlimited market, like iron and steel, there would be more force in the argument.

Mr. Becker has very considerately embodied the principal conclusions resulting from his detailed investigation in a preliminary digest of results, a mode of presenting the essential features of the subject which is highly commendable. From this outline we quote the following summary:

Quicksilver appears to be rather more than three times as abundant in nature as silver. The quicksilver produced in the world from 1850 to 1885, inclusive, weighed 1·74 times as much as the silver produced, but the value of the silver was about 16·4 times that of the quicksilver. The great quicksilver-producing localities of the world have been Almaden in Spain, Idria in Austria, Huancavalica in Peru, California and the province of Ewei-Chau in China. No statistics are known to exist of the Chinese product. The total known products of the other regions take rank in the order in which they are named above, but of late years Peru has produced nothing, and from 1850 to 1885 California yielded about half the total product. The production of Italy is more important than it is usually assumed to be. In 1886 the yield was 7,478 flasks. The production of Calif rnia, which was nearly 80,000 flasks in 1877, was only about 30,000 in 1886. [It was 25,650 flasks in 1889.—ED. E. AND M. J.]

A chain of quicksilver deposits of very greatly varying commercial importance almost girdles the world. Beginning in Spain, these deposits are distributed along the great chain, including the Alps, Caucasus, and Himalayas to China; thence through Japan along the eastern edge of the Asiatic continent to the Arctic circle. Beginning again in Alaska, the deposits follow the western Cordilleras down to Chili. Brief descriptions of the more important or more interesting of these deposits are given in Chapter II., and serve as an introduction to the discussion of the deposits of the Pacific slope.

The sedimentary rocks of the coast ranges of California are almost all composed of granite detritus. A portion of these have been subjected to very intense metamorphism and have been converted into thoroughly crystalline rocks, in part schistose. These rocks are of cretaceous age and are grouped as pseudodiabase, pseudodiorite, glaucophaneschists, phthanites, and serpentine. Very elaborate field studies, microscopical examinations, and chemical analyses of these rocks are given in Chapter III., which is mainly devoted to the investigation of their origin and the processes by which they have become recrystalline. The conclusion reached is that dynamical action, together with warm waters carrying magnesian salts and silica in solution, effected the metamorphos at the epoch of an exceedingly violent upheaval. This chapter also includes an investigation of concretions in sandstone, which are referred to the action of organic matter, and the analysis of the conditions under which decomposition will produce rounded nodules like pebbles.

The massive rocks of the quicksilver areas include granite, ancient porphyrites, andesites, rhyolite, and basalt. A new group of andesites is discussed, for which the name asperites is suggested. It is shown that these rocks are of variable mineralogical composition, even in the same eruptions, while all of them share a trachytic habitus. The name is simply a latinized equivalent of trachyte. Very remarkable andesitic and basaltic glasses occur near Clear Lake in areas of unusual size. These glasses are extremely acid, but contain also a very high percentage of alkalis, and it is because of this peculiar chemical composition that they have failed to crystallize, not because they have cooled more rapidly or under less pressure than the accompanying crystalline rocks. An attempt is also made to show that the original crust of the earth was granite, and reasons are given for believing that the primeval rock is exposed in California. The lavas burst through the granite, and the conclusion is reached that they cannot possibly consist of remelted sediments.

The historical and structural geology of the quicksilver belt is discussed in Chapter V. It is shown that the metamorphosed rocks pass over into early Cretaceous beds containing a very characteristic fossil of the genus Aucella. Soon after the era in which this mollusk lived—the Neocomian—occurred the great upheaval which induced the metamorphism. The next strata in point of age comprise a hitherto undetected group of the middle Cretaceous called the Walla beds. They were laid down unconformably on the already metamorphosed Neocomian. At the very end of the Cretaceous the Chico series were deposited for the most part on the metamorphic rocks and unconformably with them. Following the Chico are the Tejon beds, which are here regarded as Eocene; but there was continuity of life and of sedimentation from the Chico to the Tejon, or from the Cretaceous to the Tertiary—a state of things detected nowhere else in the Northern Hemisphere. Upon the Tejon lie the Miocene rocks with no notable non-conformity. The close of the Miocene was marked by an important upheaval, which was recognized by early observers. The volcanic period seems to have begun nearly at this time. The end of the Pliocene was also marked by disturbances, and most of the asperites seem to have been erupted at this epoch. The ore deposits stand in close relation to the volcanic phenomena and are probably nearly or quite all Post-Pliocene.

The gold belt of California contains Aucella-bearing beds in Mariposa and Tuolumne counties. This shell is of the same species as that in the coast ranges, and the first known upheaval of these mountains was contemporaneous with an important addition to the Sierra Nevada. A description of various forms of Aucella from different portions of the world, by Dr. C. A. White, with plates, forms an appendix to this chapter.

Descriptive chapters follow dealing with the various districts, of which detailed surveys were made. Each of these districts affords special facilities for the study of some special topic. The Clear Lake region contains fresh-water Pliocene beds, and in it the age of andesites can be determined. It also contains remarkable areas of volcanic glass. At Sulphur bank cinnabar is being precipitated from heated waters largely by the action of ammonia. At Knoxville, besides the ore deposits, there are admirable opportunities for determining the age of the metamorphic rocks and for studying the process of alteration. At New Idria the non-conformity between the metamorphic rocks and the Chico and the continuity between the Chico and Tejon appear. The New Almaden mine is particularly well adapted for the study of the structure of the ore deposits. At Steamboat Springs cinnabar is being deposited without the compilations introduced by the presence of ammonia,

In Chapter XII. the Great Western, Great Eastern and Napa Consolidated mines are described, and in the next chapter more or less information is given concerning each of over fifty minor deposits on the Pacific slope. Some of these have been productive mines, while others are mere prospects of only a geological interest.

A general description of the deposits described follows, including the enumeration of the gangue minerals, the microscopical character of ores, etc. It appears that the cinnabar has been deposited solely in pre-existing openings, and never by substitution for rock. The fissure systems, which are always present, are very irregular, and deposits cannot be conveniently classified according to existing systems. A new descriptive term, "chambered vein," is suggested, which would include nearly all the deposits. A chambered vein is defined as a deposit consisting of an ore-bearing fissure and of ore bodies contiguous with the fissure which extend into the country rock. It appears that all of the deposits described have probably been deposited in the same way from hot sulphur springs.

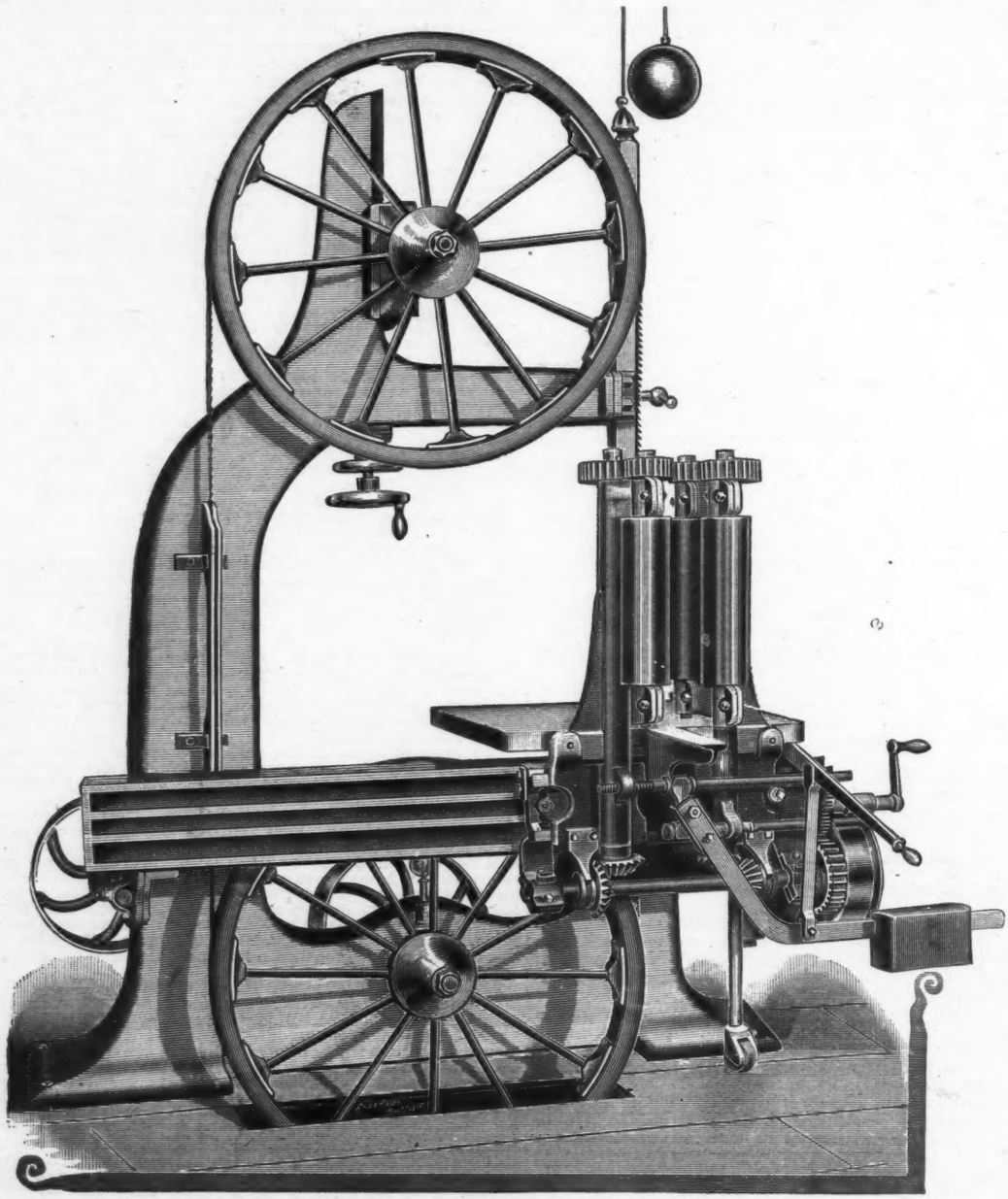
Chapter XV. deals with the processes by which the ore has been dissolved and precipitated in nature. It is shown by experiment and analysis that cinnabar unites with sodium sulphide in various proportions, forming soluble double sulphides, and that these compounds can exist in such waters as flow from Sulphur Bank and Steamboat Springs either at ordinary temperatures or above the boiling point. Metallic gold, iron pyrite, copper pyrite, and other minerals found with cinnabar are also soluble in the same solutions.

A discussion of the origin of the ore concludes the investigation. It is shown that the quicksilver is probably derived from granitic rocks by the action of heated sulphur waters which rise through the granite from the foci of volcanic activity below that rock.

For the convenience of those who consult the report the separate chapters are made as far as possible independent of one another, a plan involving a certain amount of repetition. Further, to facilitate the use of the volume, the last chapter presents a summary of those which precede it.

BAND, SCROLL AND RE-SAW.

We illustrate the new band, scroll and re-saw of Messrs. Frank & Co., of Buffalo. It is a machine that can be readily changed to do any kind of scroll-sawing that can be done on a band-saw, and especially adapted to heavy work. Wheels are 42-inch diameter and will carry a 3-inch saw. Spindles are 2-inch hammered machinery steel and run in best babbitt-metal boxes 12 inches long. There are four 4½-inch feed-rollers, all power driven. They are self-centering, or can be adjusted to cut a thin board from either side of a thick plank. By loosening two screws the rollers can be tilted to any angle for sawing bevel, weather boards or any like work. The angle of rollers is controlled by means of two screws.



BAND, SCROLL AND RE-SAW.

The feed works are driven by belts at the rear of machine, belt running from the main shaft to cone pulley at the back of machine, and thence to cone pulley, compounding into gear at the front of machine, as shown in cut. Feed can be instantly started and stopped at the will of the operator. The feed works will expand to take in a 6-inch plank 26 inches wide, the greatest depth the machine will re-saw. By loosening two bolts the feed works can be slid to the back side of frame upon the cross bar shown in the cut, which will take it out of the way of the operator, or the feed works will swing upon the cross bar at right angles with the machine, which is the most convenient way to dispose of it. The upper wheel has a vertical adjustment of 14 inches, and is arranged to tip to control the position of saw upon surface of same. This wheel is raised and lowered by means of a hand wheel and screw, and when in position by means of another hand wheel acting as a jam nut it is held in position. Height of machine to top of wheel at the highest point is 9 feet 11 inches. The table for scroll sawing is of iron,

and when feed works for re-sawing is removed the table can be moved forward into position upon planed slides. This table acts as a back rest or table when re-sawing. Weight of machine is 3,600 pounds. One 2¼-inch and one ⅝-inch saw go with each machine. Tight and loose pulley 20-inch diameter by 6½-inch face, and should run 375 revolutions. Bearings outside of tight and loose pulleys.

THE AUSTRIAN COPPER TRADE.

Special Report for the Engineering and Mining Journal.

The following sketch of the condition of the copper trade in Austria in 1889 was prepared for the annual review of the ENGINEERING AND MINING JOURNAL, but was accidentally delayed :

The year 1889 has been a very good one with the Austrian copper trade. The railways which, during the latter half of 1887 and 1888, kept off the market as much as possible, bought in 1889 quite freely, especially fire-box copper.

We see no signs of the Austrian companies returning to the use of brass flues for locomotive boilers, but the demand for thick copper ferrules to braze onto iron flues has been very good.

On the other hand, some of the Italian railway engineers are now using brass flues with thick copper ferrules brazed on to the firebox end, which they say makes a very good job and materially reduces repairs on leaky tubes.

We see no improvement in the demand for electrical copper.

The demand for war material has been very brisk, not only for home requirements, but also for Italy, Servia and Bulgaria, who have placed quite large orders for cartridge metal and copper gas rings for shot and shell.

The general demand for hardware purposes has not been very good, although light sheets have been fairly inquired for.

There are several projects on foot for building beetroot sugar factories in Hungary, so as to render Hungary independent of Bohemia for its sugar supply. If these projects are carried out they will absorb a fair amount of copper, especially cooling tubes and pan copper.

The outlook for the year 1890 is so far good, if prices keep at about the present level, but for some kinds of ordinary merchants' material the demand is slack.

Let us hope that speculators will not take advantage of the present state of trade in England and on your side to force prices up beyond the present level, and then we may hope for a good year. B.

Fast Railroad Time.—The best time ever recorded in the history of railroading was made in a late run over the Atchison, Topeka & Santa Fe system between Bakersfield and Lathrop, a distance of 220 miles, thedistance being accomplished in 205 minutes. This is the greatest speed ever made in a continuous run for such a distance with one engine. The engine was of Stevens type and built in 1885. Her drivers were 5 feet 10 inches and she burned 3½ tons of coal during the run. The greatest speed attained was one mile in 45 seconds, the fastest on record by 5¼ seconds. The best time made for a stretch was 10½ miles in 8 minutes, or a little more than 45·7 seconds per mile. The train was made up of two officials' coaches, and ran as a special, passing nine trains on the run, indicating some nice work by the dispatchers.

High-Power Incandescent Lights.—According to *Kuhlow* it is now possible to produce incandescent lamps of 3,000 candle power. These lamps, which have been named high candle power incandescent lamps, like all incandescent lamps have a uniform clear yellow light, whereas the arc lamps, which are at present alone employed in illuminating great spaces, have the well-known unpleasant bluish light and burn very unsteadily. The incandescent lamps hardly require any maintenance; they burn for 1,000 hours without supervision, and they are therefore much cheaper than the arc lamps which require constant attention, besides causing great expense for charcoal. The high candle-power incandescent lamps are therefore likely to soon drive out entirely the arc lamps, and the electric light will then become still cheaper and more popular, as the incandescent lamps yield a perfectly natural light and now also a light in sufficient volume to meet all requirements.

A New Telephone.—James Lowth, of Chicago, has patented the "stetho-telephone," which has been tested in several conversations between Chicago and Milwaukee over a common telegraph wire, with six other wires on the same posts, which were being operated by means of very heavy batteries. The absence of a diaphragm is one reason for its success in long lines. The operator places the receiver to the ear, and the transmitting button against the side of the throat. The Lowth stethotelephone is a combined receiver and transmitter. The combined transmitter and receiver is four and one-half inches long from the center of the transmitting button to the center of the earpiece. The transmitting button projects about two inches from the side of the instrument, and is in a convenient position to be placed against the side of the throat, when the earpiece is placed in its proper position against the ear. Holding the instrument with its transmitting button pressed lightly against the throat, the actual movements taking place in and about the larynx are conveyed by the button to the electrical parts of the instrument, and through them sent over the line to the distant receiver, in which the most perfectly formed words are reproduced.

Exports of Spanish Hematite Iron Ore.—The *Bilbao Maritimo y Comercial* shows that the exports of Spanish hematite iron ore from that port alone last year were nearly up to the heaviest on record. The only year in which they were exceeded was 1887, at which period the price of the mineral ruled very much lower than in 1889.

	Tons.		Tons.
1878	1,224,730	1884	3,155,432
1879	1,117,836	1885	3,295,982
1880	2,345,598	1886	3,160,047
1881	2,500,532	1887	4,170,422
1882	3,692,542	1888	3,580,425
1883	3,378,234	1889	3,854,635

The new year has opened with a further advance in the price of Spanish hematite ore, and Rubio has been dealt in as high as 9s. 5d. per ton, while Campanil has realized 11s. The demand for the mineral is good, and some important contracts have already been concluded at very good prices. First quality ores have been most in demand hitherto, but the inquiry is now so great that inferior Rubio has been sold at 8s. 3d. to 8s. 6d. per ton. Prices exhibit a large rise over the corresponding period of 1889, whilst it is considered likely that a further advance will be established.

A River Plow.—A curious machine for cleaning out the Sacramento River and various bars is about to be constructed at San Francisco. It is the invention of E. B. Bishop, who, before the war and the construction of the Eads' jetties, used it successfully to clear out the Mississippi River. The machine is not a dredger, but a great submarine plow, and simply clears out the channel as it runs. It is propelled by three engines of the combined power of 54 horses, and while going at the rate of 12 or more miles an hour, scoops out a space six feet deep, and 40 feet wide. The debris is shoved on either side, so that instead of the banks being weakened, they are strengthened. By working the ground over, up and down the river several times, the whole may be cleared out.

The submarine plow will be 100 feet long, 35 wide and 12 feet deep. Directly under it will be three great cone-shaped screws, working to a point in a monster cone or screw. Each of the three main screws is to be 40 feet long, on which will be flanges or blades two and a half feet deep at the base, and tapering as they turn around the cone to three inches in depth. The cap cone which comes over this will be eighteen feet long, and be equipped, like the others, with steel screw flanges. The machine will first go up the river and stir up the detritus, and then turning, go down, when the current, working with the flow, will soon clear out the river effectually.

Mine Timbering.—Relative cost between square set system and cribbing :

	Feet.
Shaft, 5 × 10 inch square sets 4 feet apart, timbers 6 × 8 inches planked with 2 inch thick boards, 2 side pieces 6 × 8 inches, 10 feet long	80
Two end pieces 6 × 8 inches, 5 feet long	20
Two inch boards for the sides	160
Two inch boards for the ends	80
Two inch boards for partitions	80
Total	420

Divided by four gives 105 feet for each vertical foot of shaft.

Cribbing shaft 5 × 10 inches double compartment.

	Feet.
Six pieces, 4 × 6 inch timber, 10 feet long	120
Six end pieces, 4 × 6 inch timber, 5 feet long	60
Two inch boards for compartments	20
One middle piece, 6 × 8 inches, 5 feet long	20
Total	220

A difference of 115 feet in favor of the square set system, saving time and labor in sinking shafts.

BOOKS RECEIVED.

[In sending books for notice, will publishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review in another page of the Journal.]

Power Towing on Canals and Rivers. By John M. Goodwin, C. E., Sharpsville, Pa. Published by the author. Pages, 80 and index. Illustrated.

A Text-Book on Roofs and Bridges, Part II. Graphic Statics. By Mansfield Newman, Professor of Civil Engineering in Lehigh University, and Henry S. Jacoby, Instructor in Civil Engineering in Lehigh University. Published by John Wiley & Sons. New York, 1890. Pages, 119. Illustrated. Price, $2.50.

PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

The following is a list of the patents relating to mining, metallurgy, and kindred subjects, issued by the United States Patent Office.

JANUARY 28, 1890.

420,029. Metallurgical Furnace. Frank L. Bartlett, Portland, Me.
420,030. Process of Treating Silver and Zinc Ores. Frank L. Bartlett, Portland, Me.
420,047. Anti-Friction Journal Bearing. William E. Elliott, Chicago, Ill.
420,056. Method of Kindling Fire in Furnace. Herbert Hackney, Chicago, Ill.
420,078. Apparatus for Decarbonizing and Purifying Iron. Rodney F. Ludlow, Springfield, Ohio.
420,079. Electric Reciprocating Tool. Harry N. Marvin, Syracuse, N. Y.
420,094. Rotary Reversible Steam Engine. John J. E. H. Payne, Lipscomb, Texas.
420,095. Shears for Metal. Charles Pettigrew, Joliet, Ill., Assignor to the Joliet Steel Company, same place.
420,100. Rolling Mill. Thomas Reed and John Rowley, Toledo, Ohio.
420,105. Dumping Car. George Ross, South Butte, Mont.
420,121. Automatic Air Brake. Joseph B. Stewart, Baltimore, Md.
420,124. Burner for Petroleum, etc. George M. Stone, East Jaffrey, N. H.
420,153. Pneumatic Separator and Grader. Joseph P. Gent, Columbus, Ind.
420,154. Aerial Railway. Henri N. B. Giuseppi, Luri, Corsica, France.
420,165. Machine for drawing wire. Charles S. Morse, Bridgeport, Conn., Assignor to the Aluminum Brass and Bronze Co., same place.
420,167. Railroad Chair. George W. Rittersbach, Philadelphia, Pa., Assignor of two-thirds to Robert B. Rittersbach, same place.
420,175. Dumping Car. James G. Tomlinson, Birmingham, Ala.
420,213. Pipe-Welding Apparatus. James Simpson, McKeesport, Pa.
420,226. Car Coupling. William A. Cooper, West Grove, Pa.
420,245. Device for leveling railroads. William Rose, Lerado, Kan.
420,257. Water Motor. William A. Vernin, Sipe Springs, Tex.
420,258. Car Coupling. Thomas B. Winn, Darien, Ga.
420,277. Chain Conveyor. Frederic A. Lockwood, Boston, Mass.
420,286. Tuyere. James Stoll, Milwaukee, Wis., Assignor to George Schweickhart, same place.
420,290. Railroad Tie. Levi Haas, Chester, Pa.
420,303. Machine for Drawing Wire. Alexander H. Limont, Waterbury, Conn., Assignor to Holmes, Booth & Haydens, New York, N. Y.
420,307. Car Axle. John M. May, Cedar Rapids, Iowa.
420,329. Artificial Stone Composition. Albert M. Blackmon, Sweet Home, Texas, Assignor of two-thirds to R. M. Blackmon, John A. Youngkin and Josiah S. Youngkin, all of same place.
420,331. Rotary Engine. Alexander F. G. Brown, Dairy, County of Ayr, Scotland.
420,337. Magnetic Separator. Gurdon Coukling, Glens Falls, N. Y.
420,342. Track or Road Scraping Machine. Seth Griffin, Poughkeepsie, N. Y.
420,352. Railroad Tie. William McManes, Summit, and George E. Lum, Chatham, N. Y.
420,357. Axle Box. Alfred Robbins, Andoversford, County of Gloucester, England.
420,371. Method of Burning Cement Making Materials. James M. Wilcox, Philadelphia, Pa.
420,377. Separation of Metals from their Ores. Middleton Crawford, Liverpool, County of Lancaster, England.
420,392. Dumping Car. John R. Robinson, New York, N. Y.
420,406. Submarine Ram and Torpedo Exploder. William E. Cavett, Pittsburg, Pa., Assignor of one-third to William Bunton, same place.
420,411. Injector Burner for Hydrocarbon Oil. William C. Jaegle, Hicksville, N. Y., Assignor to the National Vulcan Burner Company, Jersey City, N. J.
420,424. Ore Feeder. Philip Hinkle, San Francisco, Cal.

PERSONALS.

Mr. Hal Sayr has resigned the management of the Compromise mine at Aspen, Colorado.

—Mr. J. B. Bandol, of San Francisco, has been appointed special agent of the census for the collection of quicksilver statistics.

Mr. George W. Maynard, the well-known mining engineer of New York city, visited Denver last week, having recently examined a Boulder County, Colorado, mine.

More than twelve thousand letters and manuscripts of John Ericsson, the great engineer, have been put in the hands of Col. W. C. Church, to use in the preparation of his biography. The first of two articles on Ericsson, by Col. Church, will appear in the February *Scribner's*, with some illustrations from rare sources, among them the reproduction of an engraving made by Ericsson at the age of eighteen.

The American Copper Manufacturers' Association held their annual meeting January 22d at Delmonico's, and concluded the session and the day with a banquet. Last year's schedule of prices and terms was in successful operation, and there was no serious effort made to change it. Only matters of detail and the election of officers engaged the attention of the association, and the business session was therefore soon concluded.

The officers elected were: President, George A. Pope, of the Baltimore Copper Smelting and Rolling Company; vice-president, Joshua Hendricks, of Hendricks Brothers, of New York; secretary and treasurer, William H. Matthews, of the New Bedford Copper Company. Besides these gentlemen there were at the banquet A. A. Cowles, Ansonia, Conn.; S. G. Snow, Boston; H. F. Bassett, Taunton, Mass.; William H. Duval, Brooklyn; E. T. Dravo, Pittsburg; L. H. Jones, Detroit; J. S. Haselton, Rome, N. Y.; E. D. Tuttle, Chicago; L. Lewisohn, New York, and Thomas Wallace, of Ansonia, Conn.

OBITUARY.

Robert M. Howland, of San Francisco, well known in the mining regions of the Pacific coast, died at Lordsburg, N. M., last week. He was 51 years of age, and came to the Pacific slope from the State of New York 33 years ago, and was one of the first miners in the White Pine District, and in several other camps of Nevada.

INDUSTRIAL NOTES.

Cordelia Furnace, Columbia, Pa., is preparing to go into blast.

No. 1 Pioneer Furnace of the Pottsville Iron and Steel Company, Pottsville, Pa., has gone into blast.

It is announced that the Tyler Tube Works will remove from South Boston, Mass., to Washington, Pa.

Messrs. Jones & Laughlins, Limited, proprietors of the American Iron and Steel Works, at Pittsburg, are building an additional blooming mill.

The Union Bridge Company, of Buffalo, N. Y., said to be the largest concern of the kind in the world, is about to move its plant to Athens, Pa.

The W. F. & John Barnes Company, of Rockford, Ill., have issued new catalogues, in both English and Spanish, and will be pleased to mail either edition upon application.

Isaac Taylor, general superintendent of Morrell, Wheeler, Mahoning & Atlas coal and coke plants has leased the above-named works. They were formerly owned and operated by the Cambria Iron Company. The change takes effect the 1st day of February.

The Syracuse Iron Works property, which has been in litigation since 1884, has been sold to Charles B. Everson, of Syracuse, for $25,300. Charles M. Warner, of Jordan, and A. A. Howlett, of Syracuse, bought the horseshoe factory. The rolling mill will be started as a merchant-iron mill.

The profits of the Pittsburg Plate Glass Company, as shown in the report submitted to the meeting of stockholders, were nearly $1,000,000. Regular dividends to the amount of 23 per cent. were paid during the year, and yesterday a special dividend of 11¼ per cent. was declared, making in round figures $950,000 net profit for 1889.

The Illinois Steel Company, at Joliet, Ill., with one exception, have been closed for a month for the annual repairs, and have been awaiting the adjustment of wages. It is said that a scale has been agreed on for the ensuing year which makes an aggregate advance of 15 to 18 per cent. on the rates of last year, and that about February 1st the mill will resume operations, with about 1,500 men.

On the 25th ult., about 100 puddlers of the Birmingham Rolling Mill, in Birmingham, Ala., organized a lodge of the Amalgamated Association of Iron and Steel Workers. On the 27th ult. the men who joined the lodge were discharged, and the others quit. The position taken by the company is that it will not allow the mill to be brought under association rules.

Judge Cox, of Washington, has signed a decree appointing Henry C. Winship, of this city, and Victor Cushwa, of Washington County, Md., receivers of the property of the Chesapeake & Ohio Canal Company within the limits of the District of Columbia. The receivers are not vested with complete power in the matter, but are appointed to hold the canal subject to the future action and orders of the court.

Application was recently made to the Treasury Department by citizens of Laredo, Tex., for permission to import from Mexico low-grade carbonate ore, to enter them in bond, mark and separate them by the process known as concentration, and then return the contents of the ore to Mexico, or, in other words, to allow the manufacture or manipulation of ores in a "concentrator" in bond for the purpose of exportation. Assistant Secretary Tichenor has informed the petitioners that there is no legal authority for the granting of such a privilege.

Dr. Gatling, the inventor of the famous gun bearing his name, met 18 gentlemen interested in the development of Philadelphia in the assembly room of the Manufacturers' Club in Philadelphia this week, and presented for their consideration his plans for the establishment of works in that city. Those present favored the locating of a factory in Philadelphia, and to that end a large amount was subscribed. A site for the new factory will be determined on at a meeting next week. Dr. Gatling submited some 12 or 15 designs of guns for consideration.

An extensive iron and steel mill is to be built at Dunbar, Fayette County, Pa., early in the spring. A company has been formed and the capital stock placed at $75,000 in $100 shares. The members of the company are business men at Connellsville, Dunbar, New Haven and Leechburg. Dr. J. J. Miller, of Dunbar, has been instrumental in forming it. Bliss & Marshall, the coke operators, have donated a size of 12 acres, on which the mill will be built. It is expected that the capacity will be 600 tons of steel per day. One department will make sheet iron from muck bar. There are to be eight puddling furnaces, one scrap and three heating furnaces and two sheet mills.

The Columbia Aluminum Company, chartered in Virginia, $3,000,000 capital, $25 shares, proposes to establish works in Washington, D. C., for extracting aluminum from North Carolina clay by a process invented by Julius Emmner, Jr. It is explained that the operation is by "combined electricity, fusion and distillation," and it is claimed that the cost will not exceed 25 cents per pound of metallic aluminum, 96 per cent. pure. Mr. Emmner has invented some improvement in storage batteries, in which aluminum supports for chloride of aluminum, as an active material, is to be used, and he expects to require large quantities of the metal for that purpose.

The Westinghouse Machine Company, of Pittsburg, Pa., has received an order through its agency at Copenhagen, Denmark, for one of its now famous automatic compound engines. The size selected is 14 and 24 × 14, and it will be used at Koppargs Bergslaget åt Falur, Stockholm, Sweden. Large numbers of these engines are now being shipped to foreign countries. Mr. John R. Tillev, who for several years past has represented British builders of machinery and steam engines at Demerara, British Guiana, has severed his British and Scotch engine connections, and has become the resident agent of the Westinghouse Machine Company, of Pittsburg, for Demerara and the British West Indies.

The Carbon Iron Works are revolutionizing the trade, in one direction at least. For a year past the company has been making steel by the direct process. Rhode Island graphite was formerly used to absorb the impurities of the iron ore. The graphite was a success, but the freight on it amounted to a considerable figure, and the company looked around for something with which to replace it. They experimented with coke, and soon found that it would answer all purposes when treated with whitewash. When coke was broken into small pieces and soaked in whitewash all the impurities of the ore were fused, the oxygen of the iron joined with the carbon of the coke passing off as carbonic acid gas, leaving the impurities in such a shape that they could be easily eliminated. By this means the blast furnaces are done away with and a great deal of expense avoided. The coke has now been in use for over a year, and as a result the carbon works are turning out some of the finest bridge plates made in the United States, and steel is being produced which is very low in phosphorus.

The M. C. Bullock Manufacturing Company, Chicago, Ill., manufacturers of Corliss engines, band friction hoisting machinery, diamond-pointed rock drills for exploring purposes, and general mining machinery, write that they have made many important additions to their plant, such as lathes, planers, slotters, boring machines, drill presses, punch and shears, etc., etc. Their orders have covered a wide range of work, among them several 75-ton Boyle ice machines, a large number of Lane's band friction hoists, ranging from 2 feet to 21 feet diameter, heavy Cornish pumps, rope haulage plants for mines, compound Corliss air compressors, their new patent slide valve Corliss engines, Murphy champion mine ventilators, rock drills, well-boring drills, and a large number of their patent diamond-pointed rock drills for prospecting. Among notable foreign orders are diamond drills for Mexico, South Africa, South America, England, Holland, Servia, and hoisting machinery for several countries named; and they are now building a large first-motion plant to wind 3,100 feet of 5-inch flat rope, with Lane's patent band friction drums, driven by a pair of tandem Bullock-Corliss engines, 18 × 28 × 48 inches, to work under 150 pounds of steam. The plant to be erected in a tunnel 2,500 feet from the boilers, and at an altitude of 15,000 feet above the sea, in one of the largest silver mines in Bolivia, where coal costs $50 per ton. The company's business has increased so rapidly that it has been found necessary to enlarge the plant, build a new smith shop 120 feet long; and erecting room 80 × 160 feet, fitted with overhead traveling cranes, and a foundry 200 × 60 feet, also fitted with traveling cranes. They further say that they take pleasure in crediting the ENGINEERING AND MINING JOURNAL with many inquiries that have led to valuable orders.

CONTRACTING NOTES.

The system of 225 miles of irrigating canals and 15 large storage reservoirs which are to be constructed by the Colorado Land and Water Company will be of sufficient capacity to irrigate from the waters of the Arkansas River about half a million acres of government and State lands lying on both sides of the Arkansas River in the counties of Pueblo, Otero and Kiowa. The contract for this work has just been placed with W. C. Bradbury & Co., railroad contractors, of Denver, Colo., and about fifteen hundred teams and three thousand men will commence work on the first hundred miles of main canal at once.

Contracts have been awarded by the Navy Department for materials for building the machinery of the cruisers 7 and 8, to be built by the government at New York and Norfolk, as follows: Wrought-iron bolt sheets, 7,500 pounds, to J. B. Morsell & Co., New York, $561.75; pig iron, 100 tons, D. S. Cook, of Wrightsville, Pa., $2,050; 200 tons steel plates for boiler shells, to the Linden Steel Company, of Pittsburg, $30,912, and 40 tons steel rods, shapes and forgings for boiler bracings, $11,332; 22,500 pounds wrought-iron nut blocks, $2,250, and 4,000 pounds wrought-iron washers, $480, to Greenlie, Wyatt & Co., New York.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one wanting Machinery or Supplies of any kind will notify the "Engineering and Mining Journal" of what he needs, his "Want" will be published in this column.

Any manufacturer or dealer wishing to communicate with the parties whose wants are give in this column can obtain their addresses from this office

No charge will be made for these services.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning American goods of any kind, and forward them catalogues and discounts of manufacturers in each line, thus enabling the purchaser to select the most suitable articles before ordering.

These services are rendered gratuitously in the interest of the subscribers and advertisers; the proprietors of the "Engineering and Mining Journal" are not brokers or exporters, nor have they any pecuniary interest in buying or selling goods of any kind.

GOODS WANTED AT HOME.

540. Engine, 60 horse power, automatic, in first class condition. New York.

541. Boiler, 75 horse-power. New York.

542. Belting, shafting, pulleys, etc. Georgia.

543. Magnesite and magnesia brick. Names and addresses of dealers and manufacturers in this country and abroad. Pennsylvania.

544. Machinery for cotton gin house. 25 horse power stationery engine and tubular or two-flue boiler to correspond; also steam or hydraulic press and two gin stands, 70 or 75 saws. Louisiana.

545. Machinery for making lime and fertilizers. Crushers, conveyors, elevators, barrel machinery, kilns, etc. Mississippi.

546. Slate machinery for making slate pencils, sawing and planing slate and making roofing slate. Virginia.

547. Ice machine and boilers with a daily capacity of 15 tons; description and bids. Kentucky.

548. Flour mill machinery and boilers for a mill to have a capacity of 40 bbls. per day. Kentucky.

549. Talc. Addresses of firms who handle this mineral. Georgia.

553. Boiler. 100 horse power. Maryland.

554. Ice machinery. Sealed bids and specifications for a six-ton ice factory delivered and set up in Kentucky. Specifications and bids must be in by February 10th. Kentucky.

555. Electric light machinery. Sealed bids and specifications for an incandescent electric light plant that will furnish 100 lights, 30 candle power. Kentucky.

556. Stone quarrying machinery supplies. Colorado.

557. Patent lime kilns. Colorado.

558. Well sinking machinery. Colorado.

559. Oil fuel burners. Colorado.

560. Rock pulverizers. Colorado.

561. Gas-holder of 100,000 cubic feet capacity, single or double lift; bids for holder and tank complete. Virginia.

562. Excelsior Machinery. A machine of the very latest improved type to manufacture excelsior, capacity from four to six tons per day; also a machine for pressing the same in 100-pound bales. Virginia.

563 Steam heating apparatus, roofing, school furniture, etc., circulars describing the same. Arkansas.

564. Engines, six or eight horse power. Tennesses.

565. Ice machine, with a capacity of two tons per 24 hours. Kentucky.

AMERICAN GOODS WANTED ABROAD.

514. Agency wanted for mining and other machinery. South Africa.

550. Machinery for manufacturing corn meal. South America.

551. Kiln for drying corn; plan and estimate of same. South America.

552. A large quantity of coke monthly for smelting purposes in Venezuela, South America. Those in a position to fill the order can learn particulars by addressing this office.

566. Box shooks (Oregon or sugar pine not wanted); sizes of ends, sides, tops and bottoms on application. 1,000 boxes 18⅜x12x9½; 500 boxes, 19½x13½x10¼; 300 boxes, 21½x12½x9¼. Australia.

567. Growers' cases, quotations, per 1,060. Australia.

568. Orange cases, quotations, per 1,000. Australia.

569. Gin cases, quotations, per 1,000. Australia.

570. Boxes, 19x11¾x11⅛; quotations, per 1,000; boxes, 10x5x10, 11⅛x6x11⅛, 12x6½x12, 14⅛x6½x14⅛, quotations, per 100 gross lots. Australia.

571. Sulky plows; full particulars of latest designs and patterns. Tasmania.

572. Agricultural machinery; catalogues and best discounts. Tasmania.

573. Gas machines; catalogues and full particulars; agency if obtainable. Australia.

574. Machinery for making corn flour. Australia.

575. Leather for buggy and coach builders, also furniture leather. Australia.

576. Shoemakers' leather, dressed only. Australia.

577. Furniture fittings, hinges, trunk fittings and satchel frames. Australia.

578. Boiler, engine, saw-mill and planing machinery. North Carolina.

GENERAL MINING NEWS.

ALABAMA.

TUSCALOOSA COAL, IRON AND LAND COMPANY.—The stockholders of this company held their annual meeting in Tuskaloosa last week. Out of 5,725 shares entitled to a vote there were 4,804 shares represented. The following directors for the ensuing year were elected: Messrs. W. C. Jemison, W. G. Cochrane, Dr. P. Bryce, J. R. Kennedy, B. Friedman, of Tuscaloosa, and Messrs. W. H. Bofinger, N. Bowling, J. C. Andrews and J. S. Rainey, of New Orleans. The new directory then elected W. C. Jemison, president, to serve without salary; George P. Ayres, secretary; George A. Searcy, treasurer. The directors authorized the president to sign a note in favor of the Alabama Midland Railroad to secure the amount of $30,000 subscribed by the land company to the Midland. This action of the directors was subsequently indorsed by the unanimous vote of the stockholders.

ARIZONA.

COCHISE COUNTY.

MAMMOTH MINING COMPANY.—At this company's mill 30 stamps are running on ore, crushing from 60 to 75 tons per day. They propose to add 70 stamps to the mill as soon as possible, making 100 in all. The ore is brought from the mine, two and one-half miles distant, with teams, but a proposition has been put forward to build a tramway to carry the ore to the mill.

MARICOPA COUNTY.

The following very conservative and plain statement of the present condition of the Phœnix mine has been made to the trustees of the company, in the form of a report, by Mr. A. G. Bradstreet, of Messrs. Bradstreet & Curtis, of this city. Mr. Bradstreet has the advantage of being a civil engineer and has considered the subject of which he treats in a plain practical way, which inspires confidence. We have seen the reports of assays and have discussed the subject with Mr. Bradstreet, and have now great confidence in the future of this property; in fact, that portion of the Phœnix vein which Mr. Bradstreet calls the "black ledge" appears to contain a large amount of ore of excellent quality from which very satisfactory profits should be earned. It will afford us great pleasure to record the realization of these anticipations and the success of those who have, under many trying and disheartening circumstances, stood by this enterprise and saved it to its stockholders.—[ED. E. & M. J.]

"The mine is situated 35 miles in a northerly direction from the city of Phœnix, Ariz., and has the advantage of having a good road to it. Thirty-one miles of the road is excellent, the last four miles not as good, but good enough so that heavy teams take freight from the city of Phœnix to the mine for $10 per ton, and so that I drove in a buggy from Phœnix to the mine in six hours. I mention this as having a bearing on the cost in case you should ever wish to send additional machinery and pipe there to increase size of mill and run same by water power.

"The mine is situated on the east bank of Cave Creek, a stream of water which takes its rise in the mountains, and is 2,300 feet above sea level. Although far enough south to presuppose excessively warm weather, yet the elevation is such as to make it a very agreeable climate for men to work in for eight months in the year, the remaining four months being too warm for comfort. I was there from December 15th to January 1st, and the thermometer stood from 50 to 60 degrees. It is never cold enough in winter to make it necessary to cover water pipe, which is important in case you should determine to pipe the water for power.

'The mine is 1,500x600 feet, or about 21 acres. The mill site 600x375, or 5 acres.

MILL.

"Mill is a twenty stamp, ten of these stamps weighing 800 pounds each, and the other ten 1,000 pounds each. The way it is geared, each stamp falls about eighty times per minute a distance of half a foot. This would theoretically call for 21 a horse power to run the twenty stamp. There is also a rock breaker which requires 5 horse power, the pumping of water and friction combined, with loss of power by belts, etc., uses 3 horse power more, making 30 horse power in all used to run the mill at present. The engine is a Fraser & Chalmers engine of 40 horse power capacity. The boiler has 50 horse power capacity. It will be seen from the above that you yet have sufficient power in reserve to run five stamps more or one Huntington mill. I found that two sides of the mill had never been covered in, and as a result whenever it rained the rain fell on the belts, and the mill had to be shut down. I had the south side covered in while there, which obviates this difficulty; but the west side is yet open, and should be covered in at once so that the plates and clean ups would not be public property. The main shaft is out of line, and the steam condenser in bad condition. To do everything which ought to be done to put the mill in good condition, $600 more should be spent on it.

"When you took the mine the plates were in very bad condition, so much so that it has cost you $1,200 to put them in good order, but they are in first-class condition now.

"Your mill, plates, and the small houses you own, in which your workmen live, are worth $30,000. I found your property cramped from want of small things which become valuable as you get further from source of supply, such as gas pipe of different sizes, reducers, dies for turning threads, gaskets, small valves, etc. One hundred dollars well expended will save you much, as you can't afford to send 35 miles to Pœhnix to purchase an inch elbow which wouldn't cost 50 cents, but which you haven't on hand. Besides, you have no extra belts in case one breaks. Two hundred dollars should be expended for this item, for at present with a broken belt the mill might have to shut down for days, as such things cannot be had at a moment's notice back in the mountains.

THE MINE.

"My idea of the mine will be better understood by reading this in connection with a map of the mine, which I herewith submit and which I made while there. The main or Shipman tunnel starts at an elevation of 52¼ feet above Cave Creek and is now opened 825 feet, with a branch tunnel from it on the same level 425 feet long, making 1,250 feet of tunnel on this level. At the center of your property, where the tunnel now ends, the level of this tunnel is 119 feet below surface of ground on main tunnel and 139 feet on branch tunnel, which gives you a large face to work from. To work the mine economically this branch tunnel should be extended to shaft C, a distance of 125 feet (shaft C being already sunk to a level with this tunnel), which would cost $425, and should be considered dead work. The main tunnel should be opened further in its present direction until it enters the Black Ledge spoken of hereafter. The Black Ledge dipping at an angle of about 45 degrees east, and this tunnel being 119 feet below the surface, 120 feet of extension would probably strike it. This extension would cost $6 per foot, and should be considered dead work.

"The Thomas tunnel starts to the south of the Shipman and 59 feet above it and runs east on this level 262 feet, with a branch to the south 76 feet. This south branch should be extended to shaft "C" a distance of 125 feet which would cost $425, but would run through ore so that it would pay for itself. This being done and also the Shipman tunnel extension to shaft "C" spoken of above, the ore can be mined very cheaply, as there would be a large face to work, and ore would be handled but once intsead of two and three times as now. The cost of the dead work I recommend on both Shipman and Thomas tunnels as above stated would not exceed $1,300, and with this done, the mining would not cost over one-half of what it does at present. There are also other short tunnels and open cuts amounting to 450 lineal feet which have been made and which open up the mine to view at several different points. There are also three shafts and two air chutes from the surface to the level of the Shipman tunnel.

"To make my idea of the mine clear it may be divided into four parts lengthwise: 1, the conglomerates; 2, the red ledge; 3, the black ledge; 4, the hanging wall, or porphyry wall.

'1. Lengthwise of the mine for a distance back of about 250 feet you get the conglomerates. These are a mixture of earth and quartz, the quartz being pieces which years ago rolled down from the ledges above and became imbedded with the soil. This portion of the mine is not very valuable. It would probably run on an average of $1.25 per ton, and to a level of the Shipman tunnel there would probably be 1¼ million tons of it, and with a large mill run by water even this could be mined and milled at a small net profit, say 25 cents per ton, but with steam it would not pay to mine at all.

"2. THE RED LEDGE.—This is a reddish quartz where nearly all of the ore extracted to date has been taken, and which is well opened up. This ledge to a level with the Shipman tunnel would be about 1,500 × 50 × 100. The south half of this body of ore is now well opened up, and there is plenty of this ore in sight to run your present mill for five years. I sampled this body of ore very carefully, and found that it averaged $5.50 per ton. I also brought back several hundred pounds of it taken as a fair sample of this ledge and sent same to Professor Ricketts, of Columbia College. The result of his assays confirmed the above statement, his lowest assay of gold being ·27 of an ounce to the ton, or $5.58, and his highest being ·29 of an ounce to the ton, or $5.99, the average being $5.78. There should be deducted 25 per cent. of this body of ledge matter for "horses" or waste ore that would not pay to mill.

"3. THE BLACK LEDGE.—I believe this will prove to be altogether the most valuable part of your vein or ore deposit. From the croppings and the float on top and the ledge which can be seen across both ends of it in the gulleys north and south of the claim, this Black Ledge seems to be 275 feet in width and entirely across your claim (1,500 feet) lengthwise. Your workings in the Red Ledge had reached within 20 feet of the Black Ledge on my arrival, and I at once had them extended, so that while there we opened up the Black Ledge in two places. We found it was very fine ore of higher grade and coarser gold than the Red Ledge. While I was there a tunnel was driven into this part of the ledge far enough to show up a thousand tons of ore. This work has been continued since I left, and yesterday I was informed that enough of this ledge had been opened up to last the mill for a year; so there seems to be but little doubt that there is a large quantity of this ore. I brought home a bag of this ore and sent a part of same to Prof. Ricketts and a part to Messrs. Ledoux & Co. for assay. The assays of Prof. Ricketts averaged 1·3875 ounces of gold to the ton, or $28.68; those of Ledoux & Co., 1·48 ounces to the ton, or $30.59. This bag of ore was not selected to get a high assay, but happened to run more than I consider the ledge will average. So far as the ledge was opened up when I left I could find but few samples which would not run $10 to the ton, and some assayed high. The Red Ledge alone, which is opened up, would be valuable property; but, in my judgment, the Black Ledge will prove far more valuable. If its quantity and quality prove, as now seems probable, it is an extremely valuable property.

"Mining and milling combined is now costing the company $3 per ton, but with a large mill run by water power, instead of steam, the combined cost would not exceed $1 per ton.

"The present cost of milling is excessive and I cannot too strongly urge you to increase the capacity of your mill and to use water as power instead of steam. Arizona is not a fuel country, both coal and wood being expensive. You are hauling your wood six miles now, and even then it is cheaper than coal. You would save enough by using water as power to pay for cost of putting in same in a few months, especially if you increase capacity of mill. By going 2½ miles up the stream on which your mill is situated you get 200 feet head of water. With this head you would need to use 12 to 15-inch pipe and a 4 to 6-foot wheel, depending on the capacity to which you increased your mill. This work complete, with water wheels, etc., all put in and ready to use as power, would cost you $25,000 to $30,000, according to size of pipe and wheel used. The kind of mill to use should be thoroughly investigated by you, but the amounts above stated would be ample to give sufficient power for 90 to 150 tons of ore per day, depending on the kind of mill used. Your present mill averages 30 tons per day. I secured the water power when there for the company, and at no expense to it.

"Assays show that you are losing much too large a percentage of gold in the tailings. To a large extent I believe this can be remedied. Professors Riotte and Ricketts are investigating this question.

"Assays show that you have been losing

from $1.50 to $14 per ton in tailings, depending on the grade of ore being run, and being in some cases as high as 48 per cent. of the ore assay in the tailings; that it is in combination in the form of arsenical pyrites, the larger portion of which can be saved by concentration, etc., you are losing enough in this way to pay dividends. The fact that the small mill you are operating by steam, which makes milling expensive, is now running at a good profit, even though you are losing much in tailings which you ought to save, will suggest to you what a large mill run by water power, with much less loss in tailings, ought to do, especially as you have plenty of ore to keep a large mill in operation for many years. Very respectfully, A. G. BRADSTREET."

PINAL COUNTY.

SILVER KING MINING COMPANY.—President H. H. Noble writes to a New York stockholder that the company's indebtness was $11,270. An assessment of 30 cents a share has been accordingly levied. The San Francisco office expenses have been reduced from $900 to $350. The office of general manager has been abolished. Concerning the annual meeting on the 14th inst., Mr. Noble says that upwards of 10,000 shares of stock sent from Boston did not arrive on time for the election.

YAVAPAI COUNTY.

PACIFIC SANDSTONE COMPANY.—This company has been incorporated with a capital stock of $10,000, divided into 10,000 non-assessable shares. The principal office is to be at Flagstaff. The officers for the first year are as follows: J. W. Weatherford, president and trustee; Wash Henry, vice-president and trustee; H. J. Miller, treasurer, secretary and trustee; Frank Manning, trustee, and C. H. McLure, trustee.

ARKANSAS.

CHOCTAW COAL AND RAILWAY COMPANY.—Proposed extensions of this company's line of railroad will connect the coal fields near McAllister, on the Missouri, Kansas & Texas Railroad, in the Choctaw nation, Indian Territory, with Little Rock, Ark., and will, of course, greatly aid their development.

CALIFORNIA.

BODIE COUNTY.

STANDARD CONSOLIDATED MINING COMPANY.—The following circular has been issued: "The annual meeting of the stockholders will be held in San Francisco on the third Tuesday in February for the purpose of choosing directors for the ensuing year, and for the transaction of such other business as may be legally brought before it. Contrary to the expectations of our president, Mr. Pettibone, at the beginning of this fiscal year, the mine has not yielded a quality of ore of sufficient value to quite pay ordinary current expenses. During the year the company has had to meet legal and other expenses in connection with the Bulwer-Standard law suits (which are still undecided), amounting to about $26,000. Of this amount $5,000 is deposited as a bond, pending an appeal of the Bulwer suit against Standard. The company has a floating debt which about equals the amount expended in law suits. Mr. Pettibone hopes, however, that recent developments at the mine will not only pay off the floating debt, and thus prevent an assessment, but that the company will accumulate a surplus in the near future. The undersigned, representing their own and other large interests in the company, request your proxy in favor of the present management." Signed, E. St. John Hays, D. Hinckley, C. H. Badeau, W. H. Oscanyan, Joseph Tate.

EL DORADO COUNTY.

CHURCH.—The parties who purchased this old mine, now known as the El Dorado, in the El Dorado mining district, says the Placerville *Democrat*, after thoroughly prospecting the mine, went to work systematically, and now have excellent works. The contracted-for double-compartment shaft is now down about 550 feet, at which point the contractors struck the vein, which was found to be 7 feet through, of fine rock, free milling and rich.

INYO CUNTY.

There is quite a rush of locators to Saline Valley, says the Inyo *Independent*, locating borax claims. A good deal of claim jumping has already been done, resulting in some confusion. The various locators appear to be making an amicable arrangement of their rival claims, and no serious trouble is apprehended. J. H. Roberts, an expert in the borax business, is reported to have located for himself and partners between five and six thousand acres in the borax swamp. Conn & Trudo are the only parties taking out borax. The unusually heavy snow on the Inyo Mountains has interfered with the work of prospectors in Saline Valley. Conn & Trudo have an open road from their camp to Cerro Gordo, a distance of about fifteen miles, and can get all the supplies needed over that route. But as their borax must come out by way of Big Pine Pass, none can be shipped until the road shall be opened.

KERN COUNTY.

According to local papers, antimony ore of high grade has been found in the mines of Erskine Creek, in this county.

SHASTA COUNTY.

GLADSTONE MINING COMPANY.—It is reported that this company, in French Gulch, will add ten stamps to its 12-stamp Paul battery, making 22 stamps and a capacity of 45 tons every 24 hours.

SIERRA COUNTY.

MOUNTAIN LEDGE GOLD MINING COMPANY, LIMITED.—This company has been formed in London, England, with a capital of £100,000, in 100,000 shares of £1 each, of which 70,000 are offered for subscription, the remaining 30,000 being reserved to the vendors in part payment of the purchase money. The directors are Messrs. E. A. Pontifex, H. Doughty Browne, Right Hon. Viscount Grimston, Francis Retallack, Frederick Williams. Messrs. Browne and Williams will join the board after allotment. The office of the company is at No. 6 Queen street place, London, E. C., England. From an elaborate prospectus published by the company, we also condense the following: "This company is formed to acquire and work the Mountain Ledge mines, situated about three miles northwest of Sierra City, on the Sierra Buttes, and a direct line between the Sierra Buttes and Young America mines. The property consists of the Mountain mine, held under United States Patent, and six claims adjoining, which gives a continuous run of about 7,000 ft. on the course of the ledge or vein which is being worked on in the Mountain mine. There are also mill sites on the right back of the north fork of the Yuba River, together with a water right securing an ample supply for milling purposes. The ledge or vein is of considerable width, and is composed of almost pure quartz carrying gold in a finely-divided state, and which can be treated by an ordinary stamp mill. The Mountain mine has been well opened from the cap of the ledge to a depth of 600 ft., and is now in a fit state of development to keep a 40-stamp mill in full work. The workings comprise five tunnels, called Prospect Tunnel and Tunnels Nos. 1, 2, 3 and 4, driven respectively 54 feet, 850 feet, 580 feet, 1,076 feet, and 50 feet, one of which, the No. 1 Tunnel, has been driven completely through the hill from south to north, and the ground located will admit of a tunnel being put in to attack the ore bodies 1,300 feet below the present deepest tunnel; but this will not be necessary for several years, as the continuation of the present tunnels will open up such a great extent of ground. The property was examined in September, 1889, by an engineer on the staff of Messrs. John Taylor & Sons, and they estimate that the reserves of ore proved by the development works to exist above the level of No. 3 Tunnel amount to 56,000 tons, or enough to keep a 40-stamp mill at work for two years; and there is no apparent reason why a reserve of ore equal to the present quantity should not be maintained, if the necessary development works are kept regularly forward. At the conclusion of their report, Messrs. John Taylor & Sons say that they can with confidence recommend the property as being a good investment, and likely to prove continuously remunerative. The cost of mining, milling and transport, including establishment charges, will, it is estimated, not exceed 16s. per ton; and the directors base their calculations of profit on an average yeild of 8 dwt. of gold (or 30s.) per ton of ore, which, after deducting estimated cost, shows a profit of 14s. per ton, or, on the quantity it is prodosed to treat, an annual profit of £18,900. It is proposed at once to construct a tramway from the mines to the mill sites, and complete the dyke, already commenced, to convey the water from the river to the mill sites, and to erect a 40-stamp mill, which will be capable of treating 75 tons of ore daily, or 2,250 tons per month. Provision is made for £35,000 working capital, which is estimated to be sufficient to erect a 40-stamp mill and other necessary plant, and pay the mining cost until the mill begins working, and leave £10,000 to provide for contingencies. The price paid for the property by the company is £65,000, of which the Vendors elect to take £30,000 in fully paid-up shares of the company. The only contract entered into on behalf of the company is dated December 18th, 1889, and made between the Gold Mines Development Company, Limited, of the one part, and the company of the other part. The schedule to this contract contains a contract dated September 23d, 1889, made between Frederick de Lafontaine Williams and George Miller Pinney of the one part, and the Gold Mines Development Company, Limited, of the other part, and two contracts, dated July 16th and 19th, 1889, respectively, each between Richard Bailey Harper of the first part, and George Miller Pinney and Frederick de Lafontaine Williams of the second part, being the contracts under which the Vendors acquired the right to purchase the said mines."

COLORADO.

LAKE COUNTY.

BIG SIX MINING COMPANY.—Leadville advices state that on this property the snow has been cleared away from the immediate vicinity of the shaft, preparatory to the building of a large and commodious shaft and engine house, while negotiations are now pending for the purchase of a large plant of machinery to go on that shaft. Articles of incorporation of the company have been filed in the county clerk's office at Leadville. The incorporators are J. H. Aller, A. B. McGill, S. C. Houck and C. A. Thompson. The objects of the formation of the company are to carry on the business of mining in all its branches, and to acquire, hold and lease or dispose of the Big Six, Little Prince, Nettie Morgan and Lottie Gaylord lode claims. The capital stock is $500,000, shares of $1 each. The company is to exist 20 years. The board of directors for the first year are J. H. Aller, A. B. McGill, S. C. Houck, C. A. Thompson, A. B. Case, H. R. Pendery and E. J. Van Camp.

DUNKIN MINING COMPANY.—The Boston *Herald* reports as follows on this company's condition and prospects: "The readily accessible part of the mine is pretty well worked over, but there is some unexplored territory left which may prove rich or poor. The company has concluded to keep on working in the hope that the income will be sufficient to develop the new mining purchase in the Breckenridge district, and perhaps something more. If the earnings are, say, $10,000 in excess of this requirement, the company may pay a dividend when that sum has accumulated. If the earnings are insufficient to open the new property, the company's cash surplus of some $26,000 will be drawn upon. The new property was paid for in full with the earnings of the Dunkin property in two autumn months. When the new property will be able to earn something, or how it will develop, are questions for future answer. The assays were promising, and showed some gold as well as silver. Development will be entered upon at once. The Dunkin has considerable surplus machinery, which will be utilized in connection with the new property. The suspension of dividends must be considered indefinite. It may be for six months, a year or longer."

ELGIN SMELTING COMPANY.—The articles of incorporation of this company have been filed in the county clerk's office at Leadville. The incorporators are Henry W. Lake, Albert Sherwin and Samuel D. Wilder. The capital stock is $150,000, shares $100 each. The directors for the first year are H. N. Lake, A. Sherwin, S. D. Welder, L. B. Hamlin and R. E. Bartlett.

PITKIN COUNTY.

CAMP BIRD.—The lease on the south end of this mine is now looking well. The lessees sunk the shaft 50 feet deeper and then drifted west to the contact which has just been reached and makes a good showing of ore. This lease is owned by W. O. Leaver, Louis Weinberg, H. F. Selleck and others. Mr. Selleck controls a large interest. J. S. Stewart, on the north end of the property, is shipping regularly. He is sending down from ten to twelve tons of ore per day that runs from 50 to 60 ounces, the last lot having returned 53 ounces per ton.

J. C. JOHNSON.—This mine is reported to be producing over 50 tons of ore a day, and there is said to be a probability that it will resume dividends with the present month.

JUSTICE MINING COMPANY.—It is announced that a strike has been made in this company's property. At a depth of 380 feet the shaft got into contact matter, but nothing was found that was of any value, and the shaft was continued until it had gone down 14 feet into the dolomite foot wall. This made the total depth of the shaft 402 feet. A level was started westward from the shaft. This level has been run ten feet, says the Aspen *Times*, and shows something more than three feet of pay mineral. The contact was pitching quite sharply where it was cut by the shaft, but where it is being opened by the level it has flattened, though maintaining the regular northwest dip. The ore runs from 50 to 60 ounces per ton and about 10 per cent. lead. It lies between blue and short lime and has the true dip of the contact. The work in the Last Dollar shows a rich ore chute which should enter the Justice territory about 150 feet northwest of the shaft. A rich ore body was also found in the Dollar pitching toward the Justice shaft. This was cut off by a fault, but the present discovery made by the Justice people indicates that the two ore chutes found in the Dollar unite into a single deposit within the Justice's lines. The developments mentioned would indicate that at least ten acres of the Justice group is certainly highly valuable.

The sinking of the Justice shaft was begun in July last. Water was encountered at a depth of 50 feet and considerable delay resulted, and a large plant erected, embracing a 60 horse power boiler and a 35 horse power engine. The actual time consumed in sinking was five and a half months. The shaft is 4½ x 9 feet in the clear. A sump was put in at 138 feet deep, in which most of the water is caught. The total cost of the work, including machinery, buildings, etc., has been $24,000. The company is organized under the laws of this State, with a capital stock of 100,000 shares at $10 each, assessable. It is a close corporation, 90 per cent. of the stock being held by about a dozen gentlemen. Among these are George W. Crowe, W. R. Rust, T. G. Lyster, I. W. Shilling, E. R. Holden, Peter Lux and J. H. Richards. Fully half of the stock is owned by residents of Aspen. George W. Crowe is president and manager of the company, with W. R. Rust as secretary and T. G. Lyster as treasurer.

MALDEN GROUP.—Mr. Nelson Hallock is pushing work vigorously on the Malden and Goldsmith Maid in Hunter Park. After prospecting near the surface, he determined to gain depth, and has been

sinking for several months. The shaft, which is in the foot-wall, is now 300 feet deep It is Mr. Hallock's intention to go about 50 feet deeper and then drift west to the contact. He believes at that depth he will find the lode regular and in place, and hopes to intercept an ore chute with the level, or with a very little drifting on the vein.

MOLLIE GIBSON CONSOLIDATED MINING COMPANY.—One of the most important transactions that have taken place recently, says the Aspen *Chronicle*, was the absorption of the Juniata mining claim by this company, thus extending the southern boundary of its possessions to the end-line of the 1,001 at the base of the Aspen mine. It is understood that from the Mollie Gibson incline most of the explorations will be conducted, but it is possible that in the acquisition of the Juniata, equally comprehensive workings will begin at that point, and put forward to connect with those that are extending from the Mollie Gibson.

SMUGGLER MOUNTAIN TUNNEL.—The breast of the tunnel by which Smuggler mountain is being penetrated scored the 875-foot notch recently, and is proceeding at the rate of from 10 to 12 feet a day in the gray limestone. Mr. Brunton stated recently that it would probably be some time in the summer before the ore chutes of the locality were intercepted, while, says the Aspen *Chronicle*, the contract only took the great aisle to the corner of the J. C. Johnson mine or a distance of 2,064 feet. At present two Eclipse drills are being operated and the work is progressing on a satisfactory scale.

TAYLOR & BRUNTON SAMPLING WORKS COMPANY.—Articles of incorporation of this company have been filed in the office of the County Clerk and Recorder. The incorporators are F M. Taylor, Theodore Little, George W. Crowe, W. H. Yankee and D. W. Brunton. The same gentlemen are also directors for the first year. The company will conduct a general ore milling business in the county. The capital stock is $25,000; divided shares $100 each.

SUMMIT COUNTY.

IDALIA AND DIAMOND B. MINING AND MILLING COMPANIES. — At a meeting of these companies, held at Denver recently, the two companies were consolidated, the directors adopting the latter name. The president of the company is Mr. A. F. Beattie, of Chicago, who is president of the Chicago Mining Exchange and Guaranty Company. Geo. O. Keeler was elected vice-president, W. A. Keeler secretary, and A. F. Beattie, George I. Keeler, W. A. Keeler, E. H. Mason and C. N. Perkins, directors. By-laws of the new company were submitted and approved, and arrangements made for an application to list the stock of the company at the Denver Mining Exchange. The company owns 40 acres of patented land in Summit County, about 10 miles from Leadville, which adjoins the Robinson consolidation.

IDAHO.

The following freight rates on lead ores and concentrates from the Cœur d'Alene, Idaho, mines, esst and west, have been established by the Union Pacific Railroad :

Crude ore carrying less than 40 per cent. of lead, $12 to Missouri River, and $10.50 to San Francisco. Ores carrying 40 per cent. of lead or over, $16 to Missouri River points, and $12.50 to San Francisco. The rates to Denver will be $2 less than to Missouri River points. To keep Portland people protected satisfactory rates will be made as soon as Portland is ready is receive ores.

No contracts for carrying ores have been made by the Union Pacific, but that company expects to get its share of business, as the building of its road into the district has been the means of reducing the rates on ores from $5 to $10 per ton.

The effect of this reduction in rates is given in the Portland papers in an interview with Mr. De Lashmutt, Mayor of Portland, Ore., and who is largely interested in Idaho mines. This gentleman is reported as saying that the mine owners there are very well satisfied with the rates established by the Union Pacific, and all are making arrangements for greatly increasing their output.

The Sierra Nevada and Inez have built a wagon road down to the Union Pacific line, at the mouth of Deadwood Gulch, two miles this side of Wardner, where the company have built a siding for their accommodation. Bins have also been built at the mines capable of holding 2,000 tons of ores, and also bins at the railroad, and it is proposed to ship all ores in bulk. These improvements cost about $5,000. These mines have been paying $2 per ton for the last three years for hauling ore from the mine to the railroad. They have now let a contract for hauling their ores for two years at sixty cents per ton. This makes a saving of $1.40 per ton in the hauling, and another dollar is saved by hauling the ore in bulk instead of having to sack it. The difference between the new and the old freight rates amounts to a saving of from $5 to $7 per ton; so by the new arrangement a saving of at least $7.40 per ton is made.

The Sierra Nevada has been shipping about 25 tons per day for the past year. This will now be increased to 35 or 40 tons per day. The Inez will begin by shipping from 15 to 20 tons per day, and the amount will be increased as the mine is developed.

Mayor DeLashmutt has completed arrangements for shipping 15 tons per day from the California mine to the Montana Smelting and Refining Works at Great Falls.

The Stemwinder has just got up a new wire cable on the tramway. A new body of ore has been opened on the lower level better than anything struck before. The mill is running up to its full capacity, and the mine will ship 10 to 15 tons of concentrates per day.

For the first time in the history of the Granite the mill is running up to its full capacity, and shipping about 20 tons of concentrates per day. The mine is looking better than ever before, and the output is governed entirely by the capacity of the machinery. The Granite will pay another dividend of $10,000 on the 15th of this month.

The outlook for the district is very promising, as the saving in freights alone from these mines will amount to from $750 to $1,000 per day at the present output. In speaking of his mines, Mr. De Lashmutt said : "I think the Granite will pay a dividend of $10,000 per month during every month of 1890. The Sierra Nevada ought to pay from $50,000 to $75,000 dividends ; the California will be good for from $30,000 to $40,000 ; the Stemwinder will probably make a profit of $3,000 to $5,000 per month, and the Inez $4,000 to $5,000 per month. I look to see the output of that district, which is now 200 tons per day, increased to from 300 to 400 tons per day during the present year."

The new rate for crude ores will enable many mines to ship ore which have hitherto been unable to do so. Having had no concentrator, they could not afford to pay the exorbitant freight rates charged.

OWYHEE COUNTY.

Captain J. R. De Lamar, of De Lamar, Idaho, is the purchaser of the two-thirds interest of Christian and Louis Wahl in the Wilson, Chicago, Christian Wahl, Louis Wahl, Phœbe Grace, Eva and Pharaoh mines, together with mill sites, water rights and tunnel sites, all situated near De Lamar, in this county. The mill at De Lamar, says the Silver City *Avalanche*, will at once be enlarged, so that it may reduce 100 tons of ore per day instead of fifty.

MICHIGAN.

ST. MARY'S CANAL MINERAL LAND COMPANY.—The company is the parent of nearly all of the companies operating copper mines on the mineral range of Lake Superior, the entire mining property of the Tamarack Company, and a large part of that of the Calumet and Hecla Company, not to mention others of less note, having been purchased from it. Its property embraces thousands of acres of land which is practically unexplored, but for the most part heavily timbered, while much of its mining ground lies adjacent to producing and profitable mines. Dividends paid out of the profits of copper taken from land originally owned by the St. Mary's Company probably amount to more than $25,000,000, and the market value of the shares of companies which are its natural offspring reaches a much larger sum.

This company still has more than 100,000 acres of mineral and timber lands for sale, particulars of which can be obtained from the company, as will be found in the advertising columns of the ENGINEERING AND MINING JOURNAL.

COPPER MINES.

OSCEOLA MINING COMPANY.—Advices from the mine under date of the 25th inst. say that the Opeechee shaft is down to the fifteenth level. As drifting extends to the south, a very good lode is encountered, much above the average in quality. All the levels from No. 4 shaft (1,500 feet north of the Opeechee) show good stoping ground as they are advanced toward the last named, and this ground maintains a degree of regularity which the company's officers think appears to prove the value of this part of the Osceola's territory.

SENECA.—This mine, one of the Clark-Bigelow properties seldom heard of, which lies near the Kearsarge mine, has extended its corporate existence 30 years, from March 23d next, under the laws of Michigan. The property of the Seneca, says the Michigan *Copper Journal*, comprises quite a large tract lying in Allouez township, Keweenaw County, all in town 57, range 32. Many years prior to 1882 certain mining operations were executed on the property in the Kearsarge conglomerate and the work abandoned. In 1882 the owners of the property decided to prosecute further explorations. Considerable work was done at the time, a shaft was sunk in the foot wall and carried down to the fourth level, and in the second level a cross-cut was made through the lode to the hanging wall a distance of 70 feet horizontally. the lode being 50 feet wide. A second shaft was sunk 400 feet north of No. 1 and the two connected at the second level. Test pits were also sunk on the amygdaloid on the property. No stoping or drifting was done. This work was undertaken with considerable confidence of favorable results and quite a plant of machinery, etc., and dwelling houses were erected. Nothing could be found, however, on which to base a mine and the machinery was removed. The capital stock consists of 40,000 shares at $25 each. The officers are J. W. Clark, president; A. S. Bigelow, secretary and treasurer.

TAMARACK MINING COMPANY.—It comes from the lake that the management will begin hoisting from the No. 2 shaft early in March, instead of May, as formerly intended, the change arising from the present condition of the copper market. The fourth head of stamps will then be started and an enlarged product will result.

An installment of $20 per share, making $80, is due on Tamarack stock (the extra 10,000 share issue), February 1. The final payment will be due June, 1, next, and then the certificates will be delivered.

MISSOURI.

JASPER COUNTY.

(From our Special Correspondent.)

JOPLIN, Jan. 27, 1890.

The output of ore from the mines for the week ending January 25th was an increase over the preceding week, notwithstanding that the Lehigh and East and West Hollow mines were not producing ore on account of heavy waters at Galena. The week was dull, owing to the absence of ore buyers, as these gentlemen are still inclined to bear the ore market. In Joplin and the surrounding camps the ruling price for zinc ore was $26.50@$28 per ton. Mining operations have been more or less hindered by the sickness of many of the miners.

The following is the amount of ore sold for the week ending January 25th : Joplin mines, 683,300 pounds zinc ore, and 88,343 lead ; value, $11,013. Webb City mines, 622,330 pounds zinc ore and 98,400 lead; value, $10,544. Casterville mines, 408,300 pounds zinc and 52,330 lead; value, $6,633. Zincite mines, 275,170 pounds zinc ore; value, $3,589.08. Carthage mines, Lamb Mining Company, 180,000 pounds zinc ore ; value, $2,250. Galena, Kan., mines, 512,480 pounds zinc ore and 34,560 lead; value, $4,495.02.

All districts, total values $40,390.10.

Professor Jenney, of the United States geological staff, and Mr. Robertson, of the State geological board, have returned to Joplin to complete their preliminary survey. They think the Joplin district will require not less than six weeks' work at the present time. This is certainly a very important field for geological work that has been rather overlooked in the past, but in the near future we hope to have full government reports of our lead and zinc deposits.

DIAMOND LEAD AND ZINC COMPANY.—A. H. Frye, the owner of the Diamond Lead and Zinc Company, one and one half miles southwest of the city of Joplin, has opened up a face of 35 to 40 feet of lead and zinc; this is a new property just being opened up. The working shaft is sunk to a depth of 85 feet, passing through more or less lead and zinc for the last 40 feet, but the main run of zinc was reached by drifting from the bottom of the shaft. Saturday evening Mr. Frye turned in for his week's work 42,080 pounds zinc ore and 4,000 pounds lead, giving a cash value of $673.80. The company control 40 acres of land which is joined on three sides by the Empire Company.

EMPIRE ZINC COMPANY.—This company produced $1,400 worth of ore during the week.

HOMESTAKE.—This property of P. Murphy, at Belleville, continues to improve with development.

LAMB.—The sale of these mines at Carthage to Kansas City parties for $15,000 was the largest deal of the week.

MAHASKA MINING COMPANY.—The Hong Kong mine on this company's land cleaned up 37,720 pounds zinc ore.

RUBY LAND AND ZINC COMPANY.—This company cleaned up and sold 51,030 pounds of zinc ore at $28 per ton.

STANDARD MINING COMPANY.—This company at Zincite is putting in extra heavy machinery.

STERLING MINING COMPANY.—The Pilgrim mine of this company turned in 24,820 pounds zinc ore.

SOUTH ST. LOUIS MINING COMPANY.—This company, on the Murphy land at Zincite, have opened up a good run of zinc below the old workings at a depth of 17 feet.

NEWTON COUNTY.

NEOSHO.—I have made a flying trip to the southern part of Newton County. On my return I stopped at the prosperous little city of Neosho, the county seat. The town site takes in an area of 840 acres, being bounded on the east by a wide open valley, with depressions running back to the west, then radiating out to the north and south, making picturesque and beautiful surroundings for the town. There are a number of manufacturing interests here. I met a number of the leading business men, who all gave me a cordial welcome during my few hours stay. I will investigate the mineral recources of the county as soon as possible for the ENGINEERING AND MINING JOURNAL.

MONTANA.

BEAVERHEAD COUNTY.

POLARIS.—In this mine in the Lost Cow district the present depth of the shaft is 300 feet. The mine gives employment to 26 men in and around the works. John Long is the superintendent. Work in the mine is confined below the 100-foot level, the ledge running from 2 to 12 feet in thickness, and the rock assaying across the face of the lead 60 ounces per ton. The ore produced is shipped

to Denver, Colo. The property is situated close to the flourishing little camp of Bannack.

DEER LODGE COUNTY.

BI-METALLIC MINING COMPANY.—This company has just closed a contract for the largest hoisting works, which were purchased from Fraser & Chalmers of Chicago, and, it is stated, cost $40,000.

RELIABLE.—This property is located in a gulch about eighty rods west of the old Northwest mill, near Phillipsburg, and is owned by Messrs. R. Nelson, F. J. Wilson, Nate Vance and Drs. Allen and Ray. A shaft has been sunk about 20 feet, at which depth it is stated that a 5-foot vein of ore is exposed that will average (so the owners claim) 300 ounces in silver to the ton, and as depth is attained the body gradually widens. Five to six tons of ore have already been taken out, and the owners are now constructing a shaft house and making other preparations for active development on the property. There is also a large body of manganese in sight. It is the intention of the gentlemen interested in the property to make some shipments of ore soon to defray the working expenses, and also to put in steam hoisting machinery as soon as practicable.

SOUTHERN CROSS MINING COMPANY.—The second clean-up from this company's mill run was made last week, with about the same result as on the previous occasion, in the neighborhood of $3,500 being realized.

JEFFERSON COUNTY.

It is reported that Messrs. Harris & Hazelton have bonded their Beaver Creek mines, near Placer, including the General Custer, Agua Frio, General Sherman, R. G. Ingersoll, Jo Dandy and Buckeye lodes, to Charles Clark for $75,000, the bond to run until April 1st next.

EAST PACIFIC.—This mine is located in the Beaver Creek mining district, and may be classed as being one of the largest producers in Jefferson County. It is owned by J. W. Kendrick, chief engineer of the Northern Pacific road, and Messrs. Winston Bros., of St. Paul, railroad contractors. Considerable development work is being done on this property in the draining of the tunnels. The lower tunnel, when driven to the vein, will open the mine at a vertical depth about 900 feet from the surface of the vein. Recently, ample buildings have been erected, including a complete assay office, and a good road of easy grade has been made, leading to the upper workings of the mine, which is under the superintendence of W. E. Sanders. It has been producing of late about 300 tons of high grade ore per month and employing about fifty men. An offer was recently made to the owners of this property for a lease and bond on the same, which was declined.

SILVER BOW COUNTY.

ARGENTINE MINING C$MPANY.—At a meeting of the trustees of this company, held in Butte on the 20th ult., it was decided not to sell any more treasury stock for less than 20 cents per share. The trustees decided also to sink a double compartment shaft 200 feet. Three shifts of men will be put on and the work of sinking prosecuted as fast as possible. It is reported that two leads, one 14 feet and the other 10 feet wide, have been tapped by the tunnel. A streak of talc 10 feet wide separates the two leads. Both leads look well.

BELLE OF BUTTE.—The McNully Brothers are prospecting in this old mine. Work is confined above the 50-foot level. The present depth of the shaft is 100 feet. Hopes are entertained of encountering the old chute of ore.

BIG OX MINING COMPANY.—Work at both the lower and upper mines of this company, says the Butte *Miner*, is being pushed with increased vigor. Recently about 18 inches of rich ore were encountered at a depth of 98 feet from the surface in the face of the tunnel being run on the Upper Big Ox vein, the latter being located about a mile from the Big Ox mine proper. The Upper Big Ox lode is about four feet in width, and the strike referred to has given assay returns of over 437 ounces in silver to the ton, including a trace of gold. The force of miners at the mine has been more than doubled. The working force at the lower mines has also been doubled, and extensive drifts are being run preparatory to stoping out ore at an early date. At a recent meeting of the board of trustees of the company it was decided to erect a 30-ton concentrator at the lower mines in the early spring, and a committee has been appointed to examine into the matter and secure plans for the latest and most approved works of this character. It is the intention to also work the low-grade ore from the upper mine at these works.

FREE TRADE.—This mine, situated in Bull Run gulch, three miles north of Walkerville, is the property of Joseph Annear & Co., who are running a tunnel that will have to go a distance of about 300 feet to encounter the lead. It is only as yet in a distance of 60 feet. The work is under the supervision of James H. Hall.

GLENGARY.—A 16-inch streak of high grade ore has been struck in this mine, says the Butte *Miner*. The ore assays over 400 ounces in silver per ton. The Glengary is situated on the Rainbow ledge, north of Walkerville.

PARROTT SILVER AND COPPER COMPANY.—In our reference last week to the amount of dividends paid by the company in 1889 a typographical error made the total paid to date read $998,000. The correct figures were $498,000.

SHAKESPEARE PARROT.—This property, it is reported, has been recently purchased by the Hon. W. A. Clark, and nine miners are now finding employment in it. It was formerly the property of Presidsnt Farrel, of the Parrot Company, and it is said contains much good ore. One of the causes of not working it more extensively in the past, according to Butte papers, was on account of the adjoining properties, the Colusa Parrot and the Ramsdell Parrot being worked out at the surface and the ore in the Shakespeare acting as a pillar to hold up the ground. It is a small fraction of only 200 feet.

VOLUNTEER MINING COMPANY.—A meeting of the trustees of this company was held recently in Butte. The past record, present condition and future prospects of the mine were thoroughly discussed, after which it was decided to levy an assessment of two cents per share on the capital stock of the company, and also sink the shaft an additional 200 feet, thus making it 600 feet in all. New hoisting machinery will also be placed on the property, the present plant being inadequate to do the work lower than the 400-foot level. A station will be cut at the 400. This work will be carried on while the new machinery is en route from the East. The additional 200 feet to the shaft will be sunk by contract, bids for which will be received.

NEVADA.

EUREKA COUNTY.

EUREKA CONSOLIDATED MINING COMPANY.—This company's financial statement for December shows liabilities, $16,689.98, being principally drafts outstanding, and assets, nominally, $77,298.06, leaving a nominal balance of $60,608.38. These assets consist of cash, $2,000; bullion, $29,905, custom ores (purchased from adjoining mines and ready to be smelted), $20,078, and the rest in coke and other supplies. Inasmuch as the cash and bullion are really the only immediately available assets, it will be seen that the available surplus on January 1st was about $15,000. The December bullion sales aggregated $3,000.

STOREY COUNTY—COMSTOCK LODE.

HALE AND NORCROSS MINING COMPANY.—"A body of ore, in some places two timber sets (12 feet) in width," says the *Virginia Chronicle*, "is developed on the 1,200 level in the Hale and Norcross mine. Car samples of this ore show an average value of $35 per ton. This ore is the upward continuation of that developed nearly three years ago on the 1,300 level. At that time a winze was sunk on the ore, but it proved too narrow to extract and convert into bullion profitably. The streak was followed north and south with lateral drifts and a raise driven into it above the south lateral drift showed no improvement in width. A north raise was recently made in the ore above the 1,300 level, following the strike of the vein, which led to the development mentioned above. The fact that it has steadily widened as it was followed upward indicates that a greater breadth will be found in raising on the vein to the 1,100 level."

OCCIDENTAL CONSOLIDATED MINING COMPANY.—In reply to inquiries as to why an assessment of 25 cents per share has been levied by this company, the managers of that mine say that it was done because the company has an indebtedness of $30,000, which must be paid. The mill had to be shut down, because owing to the low grade of the ore and the discount on silver it did not pay to keep it running. The law requires careful sorting and the mill will not again be started until there is an accumulation of ore that will pay to work.

WASHOE COUNTY.

IOWA MINING COMPANY.—The annual meeting of this company was held in San Francisco recently. Charles C. Leavitt, S. McCartney, R. L. Thomas, Andrew Hollywood and C. B. Higgins were elected Directors for the ensuing year. C. C. Leavitt was re-elected president and C. B. Higgins secretary. Work was commenced upon crosscut No. 1, McBee tunnel, on Dec. 14th. The whole face of the same is now in ore.

NEW MEXICO.

GRAND COUNTY.

Large alumina deposits are said to exist twenty-five miles north of Silver City on the Gila River.

SANTA FE COUNTY.

SANTA FE COPPER COMPANY.—The three copper furnaces of this company are in full blast, and it is reported that the erection of the 200-ton concentrator has already been contracted for.

TRES HERMANOS MINING COMPANY.—This company has been incorporated by John Shank, G. W. Hartman, A. B. Smith, B. M. Williams, F. A. Blake, A. D. Higgins, R. B. Rice, A. A. Keen, A. A. Jones, of Las Vegas. Capital stock, $750,000; shares, $5 each. The principal office is at Las Vegas; the mining properties are located at San Pedro.

PENNSYLVANIA.

COAL.

Concerning the collieries in the Schuylkill district, a press dispatch from Pottsville says: Four of the Lehigh collieries at Girardville and vicinity, which have been idle for several weeks, resumed operations on the 27th ult. The Philadelphia & Reading Company has been sinking a new slope at Potts Colliery at Locust Dale, and will sink another shaft at Buck Ridge Colliery 110 yards deep. It is expected that more collieries will start up shortly.

Judge Ingraham, of the Supreme Court of New York, passed upon one phase of a suit brought by Andrew Langdon & Co., coal dealers, of Buffalo, against the New York, Lake Erie & Western Railroad Company to recover $2,613,000 damages for unjust discrimination in freight rates. The plaintiffs have been miners and shippers of coal since 1885, and having to ship on the defendant's lines, they claim that certain concessions on the public rates of transportation were made to the Delaware & Hudson Canal Company and the Hillside Coal and Iron Company which were not extended to them. They also claim that the Hillside Company is controlled by defendants, and is a device to cover up its unlawful ownership and operation of coal lands in Pennsylvania. Owing to this state of affairs Langdon & Co. assert they have lost $506,189.45, and as under the laws of Pennsylvania they are entitled to treble that amount with costs, they now want the amount named. A demurrer to the complaint being presented which set forth that the court had no jurisdiction, Judge Ingraham has sustained the demurrer, but has given the plaintiffs leave to amend the complaint. The judge holds that the Pennsylvania statute is a penal one and not enforceable in New York State.

BROCK COAL COMPANY.—This company, recently organized, has commenced active work at its projected new colliery in the east suburbs of Brockwayville. Two veins are to be worked, the Freeport upper and lower, and both will be worked immediately. The capacity of the colliery is to be equal to that of the largest in the fourth bituminous district.

COKE.

The Connellsville *Courier* has issued a review of the coke trade for 1889. It shows that the trade increased about 20 per cent. during the year. Over 5,825,000 tons of coke were shipped from the regions at the average price of $1.40 per ton, giving a total of about $8,150,000. The price of coke ran from $1 or less to $1.75 or more. The car famine was a notable feature of the year. Another is the purchase of two-thirds of the ovens in the region by the H. C. Frick Coke Company. About 500 ovens were built during the year.

OIL.

Exports of refined, crude, and naphtha from the following ports, from January 1st to January 21st, were as follows:

	1890. Gals.	1889. Gals.
From Boston	200,414	248,856
Philadelphia	8,028,541	7,783,6 5
Baltimore		2.013
Perth Amboy	393,743	766,440
New York	27,336,066	23,731,205
Total exports	35,958,764	32,532,149

SOUTH CAROLINA.

LANCASTER COUNTY.

HAILE GOLD MINING COMPANY.—The superintendent of this company writes us as follows: "The 40-stamp mill built by John Wilkes, of Charlotte, is now in successful operation at our mine. The loss in tailings is practically *nil*. Am producing with 40 stamps through No. 36 brass wire screens from eight to ten tons clean sulphurets, which we treat by barrel chlorination to about 94 per cent. of their assay value. Twenty more stamps will be added shortly.

SOUTH DAKOTA.

LAWRENCE COUNTY.

IRON HILL MINING COMPANY.—At eleven o'clock on the evening of the 22d inst. the hoisting works of this company took fire, and half an hour later had been completely destroyed. Origin of the fire is unknown, as when first discovered the building was completely enveloped in flames. Miners at work in the mine on the night shift were taken out through the Seabury-Calkins shaft. The hoisting works will be immediately rebuilt.

PLUMA CONSOLIDATED GOLD AND SILVER MINING COMPANY. This is a close corporation, with headquarters at Des Moines, Iowa, where a large portion of the stock is owned, and where most of the officers and directors reside. The capital stock of the company is $2,500,000, each share being issued at a par value of $10. The stock is not quoted in the market. The officers are: A.D. Crane, president; John S. McCormick, secretary; William R. Ankeny, treasurer, and David Hunter, superintendent. The property of the company, says Deadwood *Pioneer*, consists of a group of nine locations on the divide adjoining the Homestake, Caledonia and Monitor mines; also a mill site of eleven acres one mile distant from the mines in Whitewood cañon, just above the mouth of Gold Run. They also own the water right of Grizzly Gulch, and the water is conveyed to their mill in a covered ditch. The mill has twenty stamps, with sufficient engine power to run forty more. The mill is provided with rock crusher and self-feeders for feeding the crushed ore to the stamps.

The Pluma group of mines consists of the following claims and fractions, all lying in a solid body; The Minnie, Oella, Pluma, Dick Yates, Blue Star, Merrimac, Nellie Fraction, Fry Fraction, and a one-quarter interest in the R. E. Lee. The mine is worked through three long tunnels all converging together, and having numerous cross cuts and drifts. The ore is low grade and free milling, and will probably average about five dollars per ton. Both mine and mill have now been in constant operation for twenty-one months, giving employment to twenty men. Good ventilation is secured by the three main tunnels, and on account of the high altitude of the mine very little trouble is experienced with water. Comparatively little timber is found necessary to be used in the mine, thus reducing the cost of production. The ore is hauled in wagons to the mill, a mile distant, but the superintendent now has the plans and specifications for a cable ore carrier, which will be put in next spring. Twenty more stamps will soon be added to the mill, giving it a daily capacity of about 120 tons. A No. 6 Gates crusher will also be put in, which will have a crushing capacity sufficient to keep 80 stamps supplied with rock.

UTAH.

SUMMIT COUNTY.

ONTARIO SILVER MINING COMPANY.—Drifting on the vein northward on the 1,300-foot level of Ontario No. 2 is being done with the most satisfactory results, says the Park City *Record*. The vein shows up better here than at any place below the 700 level. The big new pump has not been placed in position yet, but after it is placed sinking in the shaft will be resumed, some time the coming spring.

STEELE GROUP.—Jos. H. Steele has succeeded in raising ample capital to develop his group of six claims. It is reported that the face of the tunnel, which is in 130 feet, shows over two feet of ore, which assays 46·8 ounces in silver and 3·1 per cent. in copper to the ton. There is also a winze 65 feet deep on the vein, sunk from the tunnel level, which shows up a great deal better than in the tunnel's face. Mr. Steele has gone to Salt Lake to purchase mining equipment, and as soon as they arrive developments will be pushed with vigor. As soon as possible the force will be increased to three shifts. The mouth of the tunnel on this property is only a few feet from the U. P. railway track.

WASHINGTON.

GARFIELD COUNTY.

IDAHO CONSOLIDATED COMPANY.—This company, of Petaha City, has been incorporated with capital stock of $1,000,000. Trustees, J. H. Walker, H. T. Spedden, D. H. Poyneer, John Houser, Eugene Spedden, Peter Talbot, H. B. Ferguson, H. D. Poyneer and E. H. Fox. Object, to mine for gold and silver and other metals.

FOREIGN MINING NEWS.

CANADA.

NEW BRUNSWICK—ST. JOHN COUNTY.

BRUNSWICK MANGANESE COMPANY.—The treasurer of this company, to which we referred in our issue of January 18th, has received advices, according to Boston papers, that a cargo of 200 tons of ore was shipped to Andrew Carnegie, of Pennsylvania, on the 23d ult. The company has as much more ready for shipment. The reported net profit is some $11 per ton. Owing to the tides of the Bay of Fundy, shipments are necessarily irregular.

PROVINCE OF NOVA SCOTIA—ANNAPOLIS COUNTY.

LONDONDERRY IRON COMPANY.—It is reported that this company, owning the Acadia Mines, will open and operate the Torbrook iron mines in connection with its works. These mines are in Annapolis County, N. S., and produce red hematite ore of a very superior quality. The company, it is stated, has secured leases on the property covering about two miles of the ore vein, which is six feet in width, and contains 62 per cent. of metal.

ONTARIO—PORT ARTHUR DISTRICT.

(From our Special Correspondent.)

The outlook for mining in this district for the coming summer is brighter than ever before in the history of mining on the north shore of Lake Superior. The Port Arthur, Duluth & Western Railway is steadily pushing its line into the heart of the silver and iron districts. The railway company is asking, and with good prospects of success, an additional subsidy from the Dominion Government for the purpose of extending its line into the center of the Rainy River district. This extension will give railway communication to all the gold mining properties in the township of Moss, the iron deposits along the Fire Steel River, Magnetic Lake and Atikokan River, besides opening up to prospectors about 60 miles in length, by 40 in width, of territory that is now practically unknown, save to the trappers and hunters in the Hudson Bay Company's service.

BADGER MINING COMPANY.—This company's January shipment amounted to $15,000. The mine keeps up its reputation as a steady producer. Its superintendent at present is engaged principally in developing new ground, very little stoping being done.

BEAVER MINING COMPANY.—This company's diamond drill has now reached a depth of 1,200 feet, and every core brought to the surface shows silver, some reaching as high as $80 per ton. Captain Hooper seems thoroughly satisfied with the results of the drilling. Development work is steadily carried on by a large force of men in the body of the mine.

ELGIN.—On this property development work has been carried on for some months past under the supervision of Capt. Hooper, of the Beaver. The vein is the same as the main vein at the Beaver, and carries silver in very large quantities. No stoping has been done as yet, but rich ground has been exposed all along the different drifts.

MURILLA MINING COMPANY.—Work on this company's property is progressing rapidly. They are stripping and enlarging the old exploratory shaft, sunk by the original owners. Several feeders have been encountered. The vein enlarges and improves as it increases in depth. It was three feet wide at the surface, and assayed $4 per ton. At a depth of 50 feet it had a width of six feet and assayed $64 per ton.

RABBIT MOUNTAIN.—This mine has been bonded to a wealthy mining syndicate, which has taken a six months' working option and have agreed to expend $10,000 in testing the property, and at the end of their term, if the testing proves satisfactory, they agree to pay in cash a certain stipulated sum which runs pretty high up in the thousands.

SHUMAH WEACHU MINING COMPANY.—This company's teams are hauling ore to Murilla Station, on the Canadian Pacific Railway, to be shipped to Liverpool, Eng. The January shipment will amount to $10,000.

WEST END MINING COMPANY.—Superintendent H. N. Nichols has arrived back from Denver, Col., and has again taken hold of this company's affairs.

SOUTH AMERICA.

PERU.

Mr. MacNulty and Senor Valdizan, representing the Grace syndicate, have denounced, according to the mining law of the Republic, in order to obtain a grant of possession from the Government, 40 silver-lead bearing lodes at Cerro de Pomacayan, in the neighborhood of the famous Cerro de Pasco.

It is reported from Bolivia that the Colquechaca mines are in bonanza, and that the output of silver is very large, the expectation being that they will produce millions.

The Bolivian government has issued a decree, to take effect from January 1st, to the effect that one-fourth of all the silver produced in the Republic must be sold to the Bolivian mint at the current price for silver, which will be paid for in Bolivian coin. The infraction of this decree will be punished by a a fine of one Bolivian dollar for each mark (eight ounces) of silver which the miner may have failed to sell to the mint. To carry the law into effect the managers of all mines and mining companies are obliged to send to the Secretary of the Treasury a return every month of the preceding month's production.

ASSESSMENT.

COMPANY.	No.	When levied.	D'l'nq't in office.	Day of Sale.	Amn't per share.
Alliance, Utah.....	..	Dec. 18	Jan. 20	Feb. 10	.10
Allouez.....	..	.....	.....	Feb. 20	.50
Baltimore..... ..	6	Jan. 10	Feb. 21	Mar. 12	.20
Bellevue - Idaho, Idaho	..	Dec. 20	Jan. 27	Feb. 15	.25
Best & Belcher, Nev.	..	Jan. 6	Feb. 13	Mar. 6	.25
Cambrian, S. Dak...	3	Jan. 2	Feb. 5	Feb. 24	.001½
Car. Leonard, Idaho	..	Dec. 14	Jan. 23	Feb. 14	.07½
Col. Quartz, Cal.....	2	Jan. 9	Feb. 11	Feb. 28	.01
Cons. New York, Nev	2	Dec. 11	Jan. 15	Feb. 5	.15
Exchequer, Nev.....	28	Dec. 16	Jan. 21	Feb. 11	.25
General Crook, Dak.	6	Dec. 9	Feb. 1	Feb. 20	.00¼
Golden Reward, Dak.....	5	Jan. 10	Feb. 12	Mch. 1	.02
May Flower, Cal....	45	Dec. 27	Feb. 3	Feb. 25	.50
Mexican, Nev	39	Dec. 21	Jan. 27	Feb. 4	.30
Mineral Hill.....	....	Jan. 15	Feb. 19	Mar. 10	.003
Monarch, Dak.....	9	Dec. 17	Jan. 17	Feb. 3	.01
Morning Star, Nev..	6	Jan. 4	Feb. 10	Feb. 28	.01½
Overman, Nev.....	61	Dec. 31	Feb. 5	Feb. 26	.25
Queen Bell, S. Dak..	5	Jan. 10	Feb. 15	Mar. 5	.01
Rochester, Utah....	..	Dec. 24	Jan. 25	Feb. 10	.01½
Seg. Belcher & Mides, Nev.	5	Jan. 4	Feb. 6	Feb. 26	.25
Silver King.....	4	Jan. 15	Feb. 26	Mar. 27	.30
Spanish R., S. Dak..	2	Jan. 9	Feb. 10	Feb. 27	.02
N. Y. O. D., Cal	5	Jan. 6	Feb. 8	Feb. 25	.15

MEETINGS.

Barber Asphalt Paving Company, at No. 1 Broadway, New York, February 19th, at 11 A. M.

Barcelona Mining Company, February 4th, at 12 o'clock noon.

Daly Mining Company, at No. 125 South Main street, Salt Lake City, Utah, February 17th, at 2 P. M.

East Hukill Gold and Silver Mining Company, at the office in Idaho Springs, Colo., February 28th, at 2 P. M.

DIVIDENDS.

Mahoning Coal Railroad Company, dividend of 2½ per cent. on common stock, payable February 1st.

Metropolitan Land and Iron Company, dividend of $6.50 per share, aggregating $250,000, $3.50 of the amount being payable on February 20th, the balance on April 20th.

Osceola Mining Company, dividend of $1 per share, aggregating $50,000, payable March 1st, to stockholders on record January 31st. Transfer books close February 1st, and re-open February 7th.

Republic Iron Company, dividend of $1 per share, aggregating $100,000.

MINING STOCKS.

For complete quotations of shares listed in New York, Boston, San Francisco, Baltimore, Denver, Kansas City, St. Louis, Pittsburg, Birmingham, Ala.; London and Paris, see pages 151 and 152.]

New York.

FRIDAY EVENING, Jan. 31.

There has been some inquiries from outside sources in the mining stock market this week and values generally have held their own. An increase in legitimate orders is always encouraging and gives more real strength to the market than any amount of reckless manipulation.

Colorado shares have attracted rather more attention than usual this week. Leadville Consolidated has been strong, rising from 11c. to 14c., closing at 13@14c. bid to-day. A lot of 500 shares is offered at 15c. Little Chief has been steady at 24c. Breece has also been firm, rising from 28c. to 34c. A sale of Adams is reported at 29c. Aspen has lost none of the ground it gained last week. A sale was made on Tuesday at $7.50. Dunkin also appears on the active list at 70 to 75c. In our mining news colums we present an interesting summary of this company's condition and prospects from a Boston authority. Freeland has also continued active, with quotations varying from 60c. to 74c., closing at about 62c. Silver Cord has awakened with considerable energy, selling at 70@73c. Several sales of Small Hopes are reported at 85c., but it is the general impression that these sales were made for the purpose of drawing out stock, as it is not known that any stock can actually be secured at this figure. Lacrosse was steady at 7@6c.

Sutter Creek continues to lead the Amador County shares. Sales were made this week at prices ranging from $1.75 last Saturday, to $2.25 on Wednesday, closing at $2.10 to-day. The market for the stock on the exchange appears to be narrow, thus strengthening the impression that the high prices named for the stock are mainly for the purpose of facilitating its disposal among outside investors.

Astoria has fluctuated peculiarly from 5c. to 12c. Sales of Brunswick are reported at 1c. It should be remembered that the last day on which the stockholders may pay the assessment of 5c. a share on their old stock is February 1st. The officers of the company say that if the assessment is not paid by to-morrow the old stock will be valueless, as steps will be taken to immediately convey the property into the hands of the new company.

Quicksilver Common sold at $6.88.

Mono changed hands at 40c. Standard Consolidated is steady at 50c.

There has been very little life in Comstock shares during the week. Consolidated California & Virginia has been firm at $4.85@4.95. A San Francisco paper is authority for the statement that the company will continue to pay monthly dividends of 25c. a share during the present year. Other sales of Comstock shares included Crown Point at $1.60@$1.65; Gould & Curry at $1.50; Alta, $1.40; Andes, 65c.; Bullion, 70c.; Exchequer, 65c.; Julia, 35c.; Mexican, $2.70; Occidental, 75@80c.; Overman, 90c.; Potosi $1.80@$1.75.

Concerning the Tuscaroras it is worthy of note that Commonwealth made very large shipments during the month of January, aggregating in bullion over $100,000, but there is apparently so little confidence in the management of these mines among New York investors that very little is being done in the shares. We note sales of Nevada Queen at 80c.; North Commonwealth, 85c.; Navajo, 35c.; Del Monte, 80c.

Barcelona is quiet at 28c., Eureka Consolidated is firm at $4.

Phœnix of Arizona has been the most active of Arizona shares. The stock advanced from 62c. last Saturday to 85c. to-day, closing at that figure.

Silver King sold at 21 to 30c. A transfer office will be opened in this city by Mr. E. R. Grant, at 57 Broadway. An assessment of 30c. has been levied.

Ontario has continued firm at 39@40c. Horn Silver is quiet and unchanged at $2.45@$2.50.

Among the Dakota shares there has also been a revival of activity. Deadwood Terra sold at $1.50 @$1.60. Homestake changed hands at $9 yesterday, but this quotation was made on a small lot of only 20 shares, and for ordinary quantities the price is weaker than it has been for sometime past, closing at $7 bid to-day. The

only definite cause ascertainable for the decline is the pressure of a block of stock on the market. Iron Hill sold at 40@50c., being weaker on account of the news that the hoisting works at the mine were completely burned last week. Father de Smet sold at 40c. No sales of Caledonia were made.

Alice continues firm. Only one sale was made within the week, and that on Saturday last at $1.20, since when very little stock has been offered.

El Cristo has continued active at $1.70@$1.80.

Among the sales of miscellaneous shares during the week were Mutual, Mining and Smelting at $1.65@$1.70; Rappahannock at 5c.@6c.

Boston. Jan. 30.

We have had an active market for copper stocks the past week, but with a few exceptions at the expense of values. There is a disposition to realize by parties who went in at low prices, but the market has taken the stock offered pretty well, and we look for an improvement in the near future. A raid was made on Boston and Montana this morning on the reported falling off in production, and in the absence of supporting orders the stock was forced down from $47, the closing price yesterday, to $43¾; followed, however, by a quick rally to $46¼, and the parties who were so anxious to sell were buyers at the highest figures.

Calumet & Hecla has been very heavy all the week, and declined from $264 to $249, rallying later to $256, a net loss of $8. We cannot hear of any reason for the decline other than the absence of buying orders.

Tamarack has been steady at $159 to $156, with but little doing in it.

Quincy declined to $70 ex div., a loss of $2.

Osceola has been the most active and the strongest stock on the list, sales aggregating over 7,500 shares. The market opened at $28, declined to $27.50 and advanced to $31, with reaction to-day to $30.50. The good outlook at the mine and the report that the company will probably pay quarterly dividends this year of $1 per share may account for the advance.

Franklin declined from $16 to $14¼, recovering to $15. The decline is due to the probability that the Pewabic mine will fall into the hands of the Quincy, which will restrict operations to its present territory. The Franklin, however, is good for many years to come and is cheap at present price.

Atlantic dull, and declined from $14¼ to $14.

Kearsarge lost its activity of last week, and declined to $9, rallying to $9⅜ to-day.

Butte & Boston declined to $14.

Pewabic sold at $9¾ and at $9.

National at $2½@2¾.

Santa Fe declined from $1¼ to $1.27½, and recovered to $1.35.

Allouez has been quite strong, although in the early part of the week it sold at $1.50, but rallying quickly to $1⅞ and $2, closing to-day at the latter price. Bonanza gained 5c., sales at 95c., but lost it again, closing at 90c.

Ridge quite firm at $1.20@$1.25. Mesnard sold at 50c. for 100 shares only. In silver stocks Dunkin declined from 70@55c.; closing, 50c. bid. Napa 2 advanced from $4.25 to $4.50.

3 P. M.—The market was fairly steady this afternoon. Boston & Montana advanced to $46.75; closing, same bid $47 asked.

Denver.

The following is the rate of commission charged by brokers doing business on the Colorado Mining Stock Exchange: Stocks selling at 10c. per share and under, 25c. per hundred shares; above 10c. and under 50c., 50c. per 100 shares; at 50c. and under $1 per share, $1 per 100 shares; $1 and under $2 per share, $2 per 100 shares; $2 and under $5 per share, $3 per 100 shares; $5 and under $10 per share, $5 per 100 shares; $10 and under $20 per share, $6.25 per 100 shares; $20 and over, $12.50 per 100 shares.

Lake Superior Gold and Iron Stocks.

(Special Report by David M. Ford, Houghton, Mich.)

There are no changes to report in the prices of these stocks, except Lake Superior, which has advanced from $65.00 asked last week to $66,00, and Republic which also shows a higher tendency, going from $50.00 to $52.50 asked.

GOLD MINING STOCKS.

Name of Company	Par value.	Lowest.	High.
Grayling Gold & Silver Co.	$25.00	$0.90	$1.00
Michigan Gold Co.	25.00	2.50	3.50
Peninsula Gold & Silver Co.	25.00	.75	.90
Ropes Gold & Silver Co.	25.00	2.25	2.50

IRON MINING STOCKS.

Name of company.	Par value.	Bid.	Asked.
Ashland Iron Co.	$25.00	...	$65.00
Aurora Iron Co.	25 00	.....	8.25
Champion Iron Co.	25 00	$105.00	110.00
Chandler Iron Co.	25.00	44.50	45.50
Chapin Iron Mining Co.	25.00	25.00	33.00
Chicago & Minn. Ore Co.	100.00	120.00	130.00
Cleveland Iron Co.	25.00	19.00	20.00
Germania	25.00	.....	11.00
Jackson Iron Co.	25 00	110.00	120.00
Lake Superior Iron Co.	25 00	62.50	66.00
Milwaukee Iron Co.	25.00	6.00	8.00
Minnesota Iron Co.	100.00	80.00	85.00
Montreal Iron Co.	25.00	.....	12.00
Norrie (Metropolitan)	25.00	.....	67.00
Odanah Iron Co	25.00	.....	15.00
Pittsburg Lake Angeline Co.	25.00	165.00	175.00
Republic Iron Co.	25.00	49.00	52.50

PIPE LINE CERTIFICATES.

(Specially Reported by Messrs. WATSON & GIBSON.)

We have no news in petroleum. It is the same old story of constantly declining stocks and an erratic market. The commercial and statistical features all favor higher prices, but the market is too narrow to justify any speculative ventures.

NEW YORK STOCK EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Jan. 25	106¼	106⅞	106⅛	106⅞	170,000
27	106⅞	107⅜	106⅜	106⅜	186,000
28	106¼	106⅜	106	106⅛	233,000
29	106⅜	106⅝	105¼	105⅝	187,000
30	105	105	104	104¾	170,000
31	104⅞	105⅝	103⅝	105¼	267,000
Total sales in barrels					1,213,000

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Jan. 25	106⅛	106⅝	106⅛	106¾	25,000
27	107	107⅜	106	106⅛	104,000
28	106	106¾	106	106⅜	365,000
29	106¼	106⅜	104⅝	105¾	542,000
30	105	105	103¾	104¾	297,000
31	104¾	105¾	103⅜	105⅛	528,000
Total sales in barrels					1,861,000

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Jan. 31.

PRODUCTION OF BITUMINOUS COAL for week ended January 25th and year from January 1st:

EASTERN AND NORTHERN SHIPMENTS.

Tons of 2,240 lbs.	1890. Week.	1890. Year.	1889. Year.
Phila. & Erie R.R.	2,959	10,614	7,085
Cumberland, Md.	96,274	299,038	223,634
Barclay, Pa.	2,860	6,585	11,804
Broad Top, Pa.	13,407	41,285	37,808
Clearfield, Pa.	80,475	313,461	280,003
Allegheny, Pa.	23,729	80,763	77,879
Beach Creek, Pa.	32,321	101,945	103,232
Pocahontas Flat Top.	37,661	130,597	100,224
Kanawha, W. Va.	*39,286	137,759	101,583
Total	328,972	1,122,047	943,250

* Week ending January 21st.

WESTERN SHIPMENTS.

Pittsburg, Pa	17,384	66,693	47,907
Westmoreland, Pa.	37,389	126,481	132,274
Monongahela, Pa.	4,854	18,866	12,472
Total	59,627	212,040	192,653
Grand total	388,599	1,334,087	1,135,903

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending January 25th, and year from January 1st, in tons of 2,000 lbs.: Week, 116,534 tons; year, 402,140 tons: to corresponding date in 1889, 353,962.

Anthracite.

All things considered, it must be admitted that the producers of anthracite coal since January 1st have acted with wisdom. They seem thus far to have made the best of a very bad job. The year opened with the market overloaded with coal and with little or no demand, a condition which had characterized the trade for some time past, and which had been brought about by unusually mild weather and by over production, for only the last of which producers were responsible.

Despite these depressing circumstances, since January 1st there has been no precipitous collapse of prices, and the restriction of the current output has prevented the accumulation of what would otherwise have been an overwhelming stock of coal above ground. Undoubtedly there has been a gradual weakening of prices, and fears have been entertained that a war between the producing companies was imminent. Nevertheless, overt hostilities have thus far been averted, and sellers are not greatly pressing the market, except in more or less isolated cases. They have apparently settled down to the conviction that, beyond restricting production and maintaining prices as well as they can, they can do nothing. It is earnestly to be hoped that this conservative policy will be unfalteringly pursued by all interested. The best place for coal that cannot be sold, as we all know, is under ground. Under present conditions it had best be kept there till actually called for, so far as possible. It should be remembered that, with the requirements of buyers as light as they are at present, and with the excessive supply, low prices will not stimulate demand. Thus, all considerations urge a continuance of conservatism.

The country every year requires a certain amount of coal. A consumption of from thirty-six to thirty-eight million tons of coal this year can be counted upon with a reasonable amount of certainty. All the country's industries are active, and the prospects of a normal winter are good. Consumers will probably carry over very little, if any, coal in their cellars this summer.

The demand for manufacturing sizes continues strong, and comparatively high prices have been paid for pea and buckwheat.

Stove coal has been offered by individual operators at $3.60 f. o. b.

Bituminous.

Current reports vary; in some a rather easier feeling is noticeable, while in others there are the old complaints of the inadequacy of the car supply.

The first of February is at hand. Naturally, there is much speculation as to whether there will now be a scramble for such contracts as have not been placed or whether the new plan of combination will be effectual.

Boston. Jan. 30.

(From our Special Correspondent.)

The market for anthracite coal is as lifeless as ever. We have had two or three cold days, but now it is mild and rainy again. Everybody is disgusted. Only doctors and drug stores seem to be flourishing this winter. F.O.B. prices are nominally unchanged, but are weak. The market is not demoralized simply because there is so little doing. To use a nautical expression, there is not steam enough on to allow of steerageway. I should quote nominally on a basis of $3.85@$4 f.o.b. at New York for stove.

The bituminous movement is inconsiderable. More bituminous has been arriving of late, and fortunately, so far, it has become almost impossible again to get any Cumberland coal at Baltimore. Clearfield coal is not so hard to get, and I hear of no one who is actually suffering for coal, though many are beginning to run short. Unless something unexpected happens to prevent. I look to see the new season for bituminous coal business open early. There is talk of a very strong combination among the producing companies, but as yet it is only talk. The Cumberland coal people here are not crowding the season any for new business, as they have no prices for any coal after March 1st, and are fortunate if they can deliver much, if any, before then on the old $2.60 f.o.b. basis.

Freights are steady at say 85c. to $1 at New York; $1.35 to $1.45 at Philadelphia and $1.60 at Baltimore.

The receipts for the week make the following exhibit:

	1890 Anthracite.	1890 Bituminous.	1889 Anthracite.	1889 Bituminous.
Week	14,739	18,824	15,990	38,341
Since Jan. 1	70,345	50,825	.....	.....

Retail trade has been a trifle more active. Dealers are generally well supplied with coal.

Buffalo. Jan. 30.

(From our Special Correspondent.)

Your readers will find in the following statements of the coal trade of Buffalo for 1889 and preceding years matter worth saving for future reference. The report is official and is from statistics furnished by railroad officials, canal officers, and custom-house returns.

There is nothing new in the trade; no changes in prices and no wise remarks to chronicle from the lips of dealers or producers.

The bituminous coal dealers of Buffalo have raised many objections already to the proposed new Car Service Association. The principal censure is on Rule 5, which says "cars containing coal or coke consigned to the regular authorized agents or any of the members of this association will not be subject to charge until consigned to some local consignee in Buffalo." This is deemed, most emphatically, to be an unjust discrimination in favor of the railroads. The matter has been referred to a Committee of five to consult with Mr. Van Etten, the manager, and report. Objection has also been made that, whereas bituminous dealers are only allowed 48 hours to unload cars without charge, anthracite men are given 120 hours.

For eighteen hours last week families residing in those districts of our city that are supplied with natural fuel gas, found to their annoyance and discomfort that, in consequence of a land slide destroying the couplings of the main pipe at Cattaraugus, they were fireless.

At a meeting of the Central Railway Club in our city last week interesting papers were read relative to the consumption of coal per car per mile. One result was a train of seven cars, average speed, 42·88 miles per hour; consumption, 47·43 pounds; cost, 4·07 cents; averaging 7·17 pounds per car mile, at a cost of ·71 cent. Another: a freight train of forty cars, at 20 miles hour speed; consumption, 106·66 pounds per train mile, at a cost of 10·66; or 2·66 pounds per car mile, at a cost of ·26 cent.

Doubtless you have noticed that Judge Ingraham has sustained the demurrer of the Erie Railroad against A. Langdon & Co., allowing plaintiffs to amend their complaint.

COAL TRADE OF BUFFALO.

The anthracite and bituminous coal trade of this city for four years is shown by the following figures:

Imports by canal—	1887.	1888.	1889.
Anthracite, tons.	59,439	149,474	100,885
Exports by canal—			
Bituminous, tons.	8,706	7,452	11,673
Imports by lake—			
Bituminous, tons.	.....	.....	.....
Exports by lake—			
Anthracite, tons.	1,894,060	2,541,905	2,151,670
Blossburg, tons*.	10,000	5,000	5,000
Imports by railroads—			
Anthracite, tons*.	3,437,764	4,399,541	4,237,685
Bituminous, tons.	1,776,217	1,892,823	2,198,327
Blossburg, tons*.	25,000	22,500	22,500
Exports by railroads—			
No statement or estimate to hand of the movement.			
Recapitulation—	Tons.	Tons.	Tons.
Total imports, anthracite.	3,497,203	4,549,015	4,338,570
Total imports, bituminous.	1,776,217	1,892,823	2,198,327
Total imports, Blossburg.	25,000	22,500	22,500
Total exports, bituminous.	8,706	7,452	11,673
Total exports, anthracite.	1,894,060	2,541,905	2,051,670
Total exports, Blossburg.	10,000	5,000	5,000
1889. Grand total imports, net tons			6,559,397
" " " exports "			2,168,343

* Partly estimated.

ANTHRACITE WHOLESALE CIRCULAR PRICES.

The following were the circular wholesale prices of anthracite coal during 1889, per gross ton:

Free on Board Vessels.

1889.	Grate.	Egg.	Stove	Chestnut.
April 15th	$4.55	$4.55	$4.80	$4.80
July 1st to close of navigation	4.80	4.80	5.05	5.05

On Cars at Buffalo or Suspension Bridge.

1889.	Grate.	Egg.	Stove.	Chestnut.
January 1st	$4.75	$4.75	$5.00	$5.00
April 15th	4.25	4.25	4.50	4.50
July 1st to December 31st	4.50	4.50	4.75	4.75

ANTHRACITE RETAIL PRICES.

The retail prices of anthracite per 2,000 pounds, delivered in the city limits, during the year 1889, were as follows:

1889.	Grate.	Egg.	Stove.	Nut.	Blossburg
January 1st	$5.25	$5.25	$5.50	$5.50	$4.00
May 1st	4.50	4.50	4.75	4.75	4.00
June 1st	4.75	4.75	5.00	5.00	4.00
July 1st to December 31st	5.00	5.00	5 25	5.25	4.00

BITUMINOUS PRICES.

The range of prices during 1889 for bituminous, delivered to manufactories, gas works, propeller lines, etc., was from $1.50 to $2.50 per net ton, in car lots, according to description: the price at retail, for family use, varied from $5 to $6 per net ton delivered, according to quality.

CITY DOMESTIC CONSUMPTION.

About 300,000 tons of anthracite and 5,000 tons of bituminous coal were consumed by families in this city during 1889.

SHIPPING DOCKS AND COAL POCKETS.

The shipping docks and coal pockets at this port are:

Name.	Average shipping capacity, daily, tons.	Average capacity of pockets, tons
Western N. Y. & Penn. R. R.	2,500	3,000
Del. & Hudson Canal Co.	3.500	5,000
Del., Lacka. & Western R. R.	3,000	4,000
J. Langdon & Co. (incorp.)	1,900	
Lehigh Docks, Nos. 1 and 2	6,000	12,000
Erie Docks	2,500	3,000
Pennsylvania Coal Company	2,000	3,300
Reading Docks	7,000	6,000
Totals	27.500	36,300

In addition, just outside the city limits at Cheektowaga, is the stocking coal trestle of the Delaware, Lackawanna & Western Railroad Company, with a capacity of over 100,000 tons storage. Also at same place the Lehigh Company has in course of construction a stocking plant of 150,000 tons storage capacity with shipping capacity of 2,000 tons daily, and at same point the Erie Railroad has a stocking plant with average daily capacity of 1,000 tons and storage capacity of 100,000 tons.

The Buffalo, Rochester & Pittsburg Company have purchased land for the erection of storing and shipping facilities, on a large scale.

LAKE FREIGHTS ON COAL PER NET TON.

	Lowest and highest rates for season. Cents.	Average freight. Cents.
Buffalo to Chicago	45 to 75	60
Buffalo to Milwaukee	45 to 75	53
Buffalo to Lake Superior points	20 to 75	40
Buffalo to Toledo	20 to 50	28
Buffalo to Detroit	20 to 30	27

The freight rates to Port Arthur and Fort William were 50@55c., and to Gladstone 40@50c. per net ton on the few loads carried.

DISTRIBUTION OF EXPORTS BY LAKE.

Port.	Net tons.	Port.	Net tons.
Chicago	988,750	Windsor	4,600
Milwaukee	497,895	Marine City	1,550
Duluth	160,430	Portage	4,900
Superior	110,110	Port Huron	4,400
Toledo	52,725	Houghton	2,850
Gladstone	36,520	Hancock	2,000
Racine	33,410	Muskegon	1,530
Green Bay	25,050	Manitowoc	6,130
Ashland	21,280	Amherstburg	1,190
Kenosha	10,950	Depere	1,110
Sheboygan	8,260	Menominee	1,150
Saginaw	21,785	Sarnia	700
Marquette	17,485	Port Clinton	740
Bay City	8,310	Mackinaw	650
Detroit	31,890	Alpena	600
Fort William	3,100	Kelly Island	690
Port Arthur	3,220	Algonac	925
Lake Linden	5,375	Oscoda	600
Sault Ste. Marie	4,800	Wallaceburg	350
Escanaba	2,250	Huron, O	240
Cheboygan	1.100	Victoria Harbor	200
Ludington	955	Pequaming	200
Washburn	800	Port Stanley	85
St. Clair	950	Port Rowan	70
Owen Sound	500	Port Burwell	35
St. Ignace	500	Parry Sound	50
Au Sable	450	Duncan City	50
Port Dover	355	Serpent River	40
Sandusky	350	Rogers City	20
East Tawas	150	Sundry places not specified	69,500
Chippawa	90		

Pittsburg. Jan. 30.

(From our Special Correspondent.)

Coal.—Market dull; prices weak, without being lower. Both rivers are in good navigable order. Coal is forwarded to the lower markets as fast as mined. Week's shipments will reach 2.500,000. Pittsburg coal is selling in Cincinnati: Fourth pool, 5c.; lower pools, 5½@6c. Nominal rates:

Per 100 bushels.		Per 100 bushels.	
1st pool	$4.75	3d pool	$3.90
2d pool	4.50	4th pool	3.25
Railroad coal			$5.20@$5.50

Connellsville Coke.—The time for set lement of the coke question is near at hand, Monday next being the appointed day. While many think the matter will be satisfactorily arranged, others have a different opinion. Week's shipment, 7,300 cars; previous week, 7,056; increase, 244 cars. Week's tonnage, 141,943 tons; increase, 3,438 tons; average daily shipments for the week, 1,216 cars.

Quoted rates are: Furnace, f. o. b., $1.75; foundry, $2.05; crushed, $2.55.

Freights.—Shipments, 70c.; Mahoning and Shenango valleys, $1.35; St. Louis, $3.65; Chicago, $2.75: Cleveland, $1.70.

FREIGHTS.

From Baltimore to: Boston, Mass., 1.60; Charleston, .80; Fall River, 1.40; Galveston, 3.00; New Bedford, 1.40; New Haven, 1.40; New London, 1.40; New York, N. Y., 1.10; Portland, 1.60; Portsmouth N. H., 1.60; Providence, 1.40; Richmond, Va., .70; Salem, Mass., 1.60; Savannah, 1.00; Williamsburgh, N. Y., 1.10.

* And discharging. † Alongside. ‡ And towage.

METAL MARKET.

NEW YORK, Friday Evening, Jan. 31.

Prices of silver per ounce troy.

Jan.	Sterling Exch'ge.	Lond'n Pence.	N. Y. Cts.	Jan.	Sterling Exch 'ge.	Lond 'n Pence.	N. Y. Cts.
25	4.85½	44 13-16	97⅝	29	4.86	44½	†
27	4.86½	44⅞	97⅞	30	4.87	44⅝	97⅜
28	4.86½	44¾	*	31	4.87	44⅝	‡

* 97½ to 97¼. † 96⅞ to 97. ‡ 97⅜ to 97¼.

Council bills advanced ¼d. per rupee this week. Market for silver has been a very fluctuating one, with general tendency downward and closes weak.

United States Assay Office at New York reports total receipts of silver for the week 106,000 ounces.

Foreign Bank Statements.

The governors of the Bank of England at their weekly meeting made no change in its minimum rate for discount, and it remains at six per cent. During the week the bank gained £1.488,689, bullion, and the proportion of its reserve to its liabilities was raised from 39·91 to 43·12 per cent., against an increase from 45·83 to 46·28 per cent. in the same week of last year, when its rate for discount was 3 per cent. The Bank on Thursday gained £20,000 bullion on balance. The weekly statement of the Bank of France shows a loss of 3,050,000 francs gold and a gain of 2,125,000 francs silver.

Domestic and Foreign Coin.

The following are the latest market quotations for American and other coin:

	Bid.	Asked
Trade dollars	$ .76	$ —
Mexican dollars	.76½	.77½
Peruvian soles and Chilian pesos	.72	.73½
English silver	4.83	4.88
Five francs	.94	.95
Victoria sovereigns	4.86	4.88
Twenty francs	3.85	3.90
Twenty marks	4.74	4.78
Spanish doubloons	15.55	15.70
Spanish 25 pesetas	4.82	4.876
Mexican doubloons	15.55	15.740
Mexican 20 pesos	19.50	1.05
Ten guilders	3.96	9.

Copper—No change in the general position of the market has taken place during the past week. The tone continues steady, and a regular business is taking place, and we don't hear of any alteration in values, which remain the same as quoted in our last. No authoritative statements have yet been issued with regard to the amount of damage done by the fire at the Anaconda mine, but there is no doubt that it has been rather serious. It is understood, however, that enough ore will be worked from other portions of the mine to keep the smelting works supplied, although it is believed that the misfortune of the fire will disorganize operations for some time to come. There is a report circulating that water is now being pumped into the mine to drown out the fire.

The European markets continue steady, and the London market for G. M. B. copper has (after slight fluctuations) gained about 10s. during the week, the latest prices received by cable to-day being spot £49@£49 2s. 6d., and three months £49 10s.@£49 15s.

Consumption appears to be going on at a satisfactory rate in Europe, and although there is some evidence of reluctance on the part of buyers to purchase for forward delivery, this is believed to be more caused by the present high rates ruling for money than by any falling off in consumption. For refined and manufactured lots the latest quotations are as follows: English tough, £56@£57; best selected, £58 10s.@£59 10s.; strong sheets' £65@£66; India sheets, £60@62, and yellow metal, 6d. per pound.

The exports of copper from New York during the last week were as follows:

To Liverpool—	Copper Matte.	Lbs.	
By S. S. City of Chester	259 bbls	267.202	$10,000
To Bordeaux—			
By S. S. Chateau Lafitte	181 bars	57,286	6,588

Tin.—At the beginning of the week the market here ruled pretty firm. As the week progressed slight advances were recorded daily, until on Thursday last very strong buying set in, which quickly drove prices up to 21c., and to-day (Friday) this strong tendency became more pronounced, and the market further advanced to 21.25c. for spot and near deliveries, with March and April tin held for the same figure. This rise in values here brings our prices up to the point where shipments can be resumed from Europe, and thus allow of the stocks on this side, which have been allowed to run down to a very low point, to be replenished. This afternoon 150 tons prompt shipment from London were done at 21.30 @21.35c.

The London market has been dull during the greater part of the week, but to-day (Friday) prices there have advanced about £1 per ton, and the closing quotations there are, spot, £94 15s.@£94 17s. 6d.; futures, £95 10s.@£95 2s. 6d.

Lead has been neglected and the amount of business transacted has been very limited, the only price at which business is reported being 3·85, at which figure there now remain numerous sellers.

The London market has also been dull and values have declined there to £13 for Spanish and £13 5s. for English lead.

The St. Louis Market.—Messrs. John Wahl & Co. telegraph us as follows: "The long expected advance in pig lead appears to be as remote as ever. Consumption of the metal, which is moderately large, does not more than keep pace with production. There being little or no speculative outlet, we can see nothing ahead that will change the inertitude of lead for some time to come. Sales since our last report will probably aggregate 400 tons at from 3·57½c. to 3·60c."

Spelter.—The market for spelter has been very irregular and quotations for prime Western have to be reduced to $5.30@$5.35. Antimony contiues very firm, and although during the week about 200 casks have arrived in New York from Europe, nearly the whole of these importations have gone into consumption. The closing quotations are Hallett's, 20¼c.@20½c.; Cookson's, 20c.@30c.

Quicksilver.—There is no important variation to note in the previously quoted prices for this metal.

Nickel.—Importations of 5,300 pounds are reported for the week. The market is without change.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Jan. 31.

Pig Iron.—Nothing has developed to weaken the position of sellers. As is usual in quiet markets, there are rumors that prices in some instances have been shaded, but no important variation in values is ascertainable, and the feeling in the trade continues to exhibit the same steadiness and confidence that we have noted for some weeks past. As for the future, therefore, we have only to reiterate that much depends upon the demand within the next thirty days. We may quote as follows: No. 1 X foundry, $20; No. 2 X foundry, $19; gray forge, $18. On another page we publish some interesting extracts from the report of the Iron and Steel Association for 1889, as promised last week.

Scotch Pig.—Glasgow cables announce that speculative influences have brought about rather a sharp decline in quotations for warrants in the foreign market, but this does not reflect any actual change in the condition of the trade, being largely due to what may be called a "bear" raid.

Spiegeleisen and Ferro-Manganese.—The transactions to which we referred as pending last week have now been closed. The actual business effected will probably aggregate about 10,000 tons. Asking prices are, therefore, somewhat higher. Nominally, we may quote about $38.50 to $39.50 for 20 per cent. ferro-manganese. Eighty per cent. is held nominally at about $100, with a firmer tone than last week.

Steel Rails.—There has been no increase in the volume of business during the week. A Western mill has sold ten thousand tons to Ohio parties. As to price, there is no change to report. While $36 continues to be the nominal asking price, buyers are inclined to think that rails can probably still be bought for $35, but there is certainly no pressure to sell.

Structural Iron and Steel.—In this line there is still a decided lull in the East, but Western reports are much more encouraging. Chicago advices say that the Northwestern demand has largely improved, and predictions as to the outlook for February are very hopeful. Ruling prices are as follows:

Delivered on wharf, bridge plate, 2·40c.; iron angles, 2·40c.; iron tees, 2·80@2·85c.; steel angles, 2·70c.; beams and channels on wharf, 3·1c.

Steel plates on wharf: Tank and ship, 2·75c.; shell, 3.10c.; flange, 3·25c.; fire-box, 4·25c.

Iron plates on wharf: Common tank, 2·35c.; refined, 2·45c; shell, 2·6c.; flange, 3·5@3·7c.; extra flange, 3¾@4c.

Bar iron at mill is quoted at 1·8@1·9c. for common and 1·9@2c. for refined. Deliveries from store are quoted as follows: Common, 2·1c. base; refined, 2·3c. base; "Ulster," 3.10c. base; Norway bars, 4·25c.; shapes, 5·25c., and Norway nail rods, 5·72c.

Merchant Steel.—Prices are as follows: Best English tool steel, 15c. net; American tool steel, 8@10c.; special grades, 13@20c.; crucible machinery steel, 5c.; crucible spring, 3¾c.; open-hearth machinery, 2¾c.; open-hearth spring, 2¾c.; tire steel, 2¾c.

Pipes and Tubes.—According to the revised schedule, rates of discount on wrought-iron pipe are as follows: Butt welded, plain and tarred, 47½ per cent. discount; galvanized, 40 per cent. discount; lap-welded, plain and tarred, 60 per cent. discount; galvanized, 47½ per cent. discount. A discount of 52½ per cent. is allowed on boiler tubes of 4 inches and larger, 50 per cent. on tubes from 2 to 4 inches, and 45 per cent. on 1¾ inches and smaller.

Cast-iron pipes remain at $25@$28, according to size.

Rail Fastenings.—Asking prices are about as follows: Spikes, 2.25c.; angle fish plates, 2.15@2.25c.; bolts and square nuts, 3c.; hex nuts, 3·25c.

Old Material.—Sale of one thousand tons of double heads for delivery at Philadelphia from the other side is reported at a figure approximate to $30 per ton. Other than this there have been no transactions of interest in the old material market during the week. The demand continues very light for old iron tee rails; $28.50 is the ruling quotation. Revised estimates of the amount of rails on the spot show that the stock here is not quite so large as it was as first supposed. Well-posted authorities estimate that there are from five to six thousand tons of tees and two thousand of double heads in New York, and recently No. 1 wrought scrap iron is quoted at $24.

Louisville. Jan. 28.

(Special report by Messrs. HALL BROS. & CO.)

Sales have increased in volume and in number of transactions; quantities varied from carloads up to 1,000-ton lots, mostly for delivery during the next 60 to 90 days. The transactions comprise various grades of both charcoal and coke metals. Prices, as a rule, have been well maintained, with the exception of a few small outside lots, which are reported placed at some concessions from the current figures. It is known that in the near future some prominent concerns will require further round quantities of iron, and there is enough of this kind of business in sight to give a hopeful feeling to the near future course of the market.

Hot Blast Foundry Irons.	
Southern Coke No. 1	$19.00@$19.50.
" " No. 2	18.75@ 19.00.
" " No. 3	18.00@ 18.75.
Mahoning Valley, Lake ore mixture	20.00
Southern Charcoal No. 1	18.50@ 19.00.
" " No. 2	18.00@ 18.50.
Missouri " No. 1	19.50@ 20.00.
" " No. 2	19.00@ 19.50.
Forge Irons.	
Neutral Coke	17.50@ 18.00.
Cold Short	16.75@ 17.00.
Mottled	15.50@ 16.00.
Car Wheel and Malleable Irons.	
Southern (standard brands)	23.50@ 24.50.
" (other brands)	19.50@ 20.50.
Lake Superior	23.00@ 23.50.

Philadelphia. Jan. 30.

[From our Special Correspondent.]

Pig Iron.—Large buying interests are endeavoring to bear the iron market, with a slim array of facts behind them. Some prophecies are being made which may possibly turn out as the prophets say, but there is very little upon which to base bear predictions at present. The fact that the demand for crude iron is at present rather light means nothing, and especially does not mean that there will soon be a renewed demand at lower prices, as is claimed in some quarters. If pig-iron makers understand the situation, and their opinions are to be accepted, there will be no reaction in prices for standard or special brands. The only reaction, if any, is likely to occur in a limited number of inferior brands, as the makers of these brands feel that it may be necessary to shade prices in order to more promptly secure a market for their product. The dullness of the past three or four weeks has naturally led a good many buyers to wait a little while longer to see how things are likely to go. The best reason for believing that good irons will remain firm is, first, that furnaces are oversold, and second, that the consumption is equal to present production. Quotations for No. 1, $20@$20.50: standard No. 2, $19, and standard forge, $18, with liberal concessions in occasional instances where quality is not an object. Bessemer pig is nominally $22.

Foreign Material.—Spiegeleisen is dull this week, because of the sudden advance which makers named last Monday, and which has cut off the possibilities of business for the present. For 20 per cent. sellers have named $40.50, which is about $2 above the views of buyers. For 80 per cent ferromangese, $100 is the average price.

Billets.—If the makers were able to accept business, in a large way, buyers would not be hard to find. There is an unwillingness among workers to book very large orders at present; the reason given is, that there is too much uncertainty as to the future of billets. Quotations, $38 to 38.50

Muck Bars.—Muck bars sold yesterday at $32.50, and to day quotations were given at $33 for the best make known in this market. It is probable that 500 tons will be sold at the latter figure to-day or to-morrow. The lowest quotation is $32, at which two or three lots have been sold.

Merchant Iron.—Were it not for the sharp competition that has been lately developed among salesmen to secure business, merchant bars would be selling one-tenth higher, according to the opinion of a leading manufacturer. The impression is quite general among buyers that bar iron will weaken before long. Makers from the interior, who have been in the city lately, deny that there is any such tendency, and refer to the fact that there is a great deal of business to be placed next month; but this is an old story—next month's business is always to be enormous. The fact of the matter is, nearly all buyers of merchant bar are buying in a hand-to-mouth way, until they see how things are going. Sales of refined bars were heard of to-day at $1.90, but stores are still getting $2.15 and $2.20

Nails.—Nails have remained at the drop of a week or ten days ago. The concession has failed to draw out large buyers; in fact, it has rather checked business that might otherwise have come along. It has been a notification to buyers that there will be some competition before spring. Iron nails are $2.20 at retail; steel nails, $2.40.

Skelp Iron.—The skelp iron makers think they have arranged for a large amount of business, but refuse to say whether prices have been cut. The ordinary quotations are 1·95 for grooved; sheared, 2·15; but these prices have been shaded.

Wrought-Iron Pipe.—The oversold condition of the wrought-iron pipe mills continues, and from all quarters the same story is told of an abundance of business.

Sheet Iron.—Outside buyers have been favoring Eastern Pennsylvania mills with good sized orders. Card rates for best refined, 3·10 to 3·70. A very good business is promised for the next few weeks; the heavier buyers are inclined to place their orders in advance.

Plate Iron.—There is nothing new to report this week, and no weakness in prices. Tank, 2·35; angles, 2·30.

Structural Iron.—Bridge builders report that they have a large amount of business to place, and will be heard from as soon as manufacturers are ready for them. Quotations: 2·35@2·40 for bridge plate; angles, 2·30; tees, 2·80; beams, 3·10.

Steel Rails.—Steel rails are $35@$36. No business of importance to report.

Old Rails.—Quotations, $27.50@$28. Holders ask more, or, rather, are waiting for bids, with a view of selling out to the highest bidder.

Scrap.—No. 1 sold to-da y at $24.50. Most other kinds do not sell quickly at present quotations. Machinery is $16.50.

Pittsburg. Jan. 30.

(From our Special Correspondent.)

Raw Iron.—Trade since our last issue shows no improvement in prices or demand. Consumers who have evidently a fair stock on hand have about made up their minds to hold off for a little longer, in order to see what effect that will have on holders, while city furnaces and holders of standard descriptions seem to think they can hold out as long as the other side. On the other hand, limited sales of outside lots have been shaded in order to meet the views of buyers. Sales reported show a pretty wide range in values. Well informed parties give their opinion that the present condition of the market will be followed by activity about the middle of February; others again think there will be an improvement inside of that time, basing their opinions on the enormous consumption that is going on. Mahoning and Shenango valleys furnacemen are very firm in their views, showing little disposition to shade prices in order to make sales. Another important feature is the coke question. On Monday next the coke men will meet to see what can be done about the new scales that come up for a decision; the coke makers have their scale, the coke owners have theirs; between them there is a wide difference. It is not expected that either will be signed in their present shape; many persons are of the opinion that a settlement will be made and a strike avoided as against any decline in iron, it is claimed that the advance in ores and coke will prevent that, but the real question is that of consumption. On that point there is no reason for discouragement, as there is a vast amount of work going on in all the large manufacturing establishments, and it is said on good authority that a great deal more will be on the market in a short time. Under these circumstances there is a disposition to wait developments. As usual there is a difference of opinion as to whether the market is nearing a turning point, when supply will equal or exceed demand for current requirements. Plausible views are entertained on both sides, but so far the makers have the advantage, as buyers continue to anticipate requirements in a moderate way.

Coal and Coke Smelted Lake Ore.		
2,000 Tons Bessemer	$23.50	cash.
1,500 Tons Gray Forge	18.35	cash.
1,500 Tons Bessemer	23 50	cash.
1,000 Tons Gray Forge	18.00	cash.
700 Tons Mill Iron, Extra	19.00	cash.
500 Tons No. 1 Mill	18.50	cash.
500 Tons No. 1 Bessemer	24 50	cash.
800 Tons Gray Forge	18.25	cash.
500 Tons Bessemer	23.25	cash.
200 Tons Off Bessemer	22.00	cash.
Coke, Native Ore.		
100 Tons No. 2 Foundry	19.00	cash
100 Tons Silvery	18.50	cash.
50 Tons No. 1 Foundry	20.00	cash.
Charcoal.		
450 Tons Foundry, Mixed Lot	20.50	cash.
200 Tons No. 3 Warm Blas	19.50	cash.
75 Tons Silvery	18.00	cash.
50 Tons Cold Blast	25.00	cash.
25 Tons Foundry, Extra	30.00	cash.
Muck Bar.		
1,500 Tons Neutral, February	30.00	cash.
500 Tons Neutral, February	30.25	cash.
500 Tons Neutral	30.50	cash.
Steel Slabs and Billets.		
2,000 Tons Billets	36.50	cash.
1,500 Tons Billets, delivered East	39.00	cash.
500 Tons Billets	36.50	cash.
Steel Wire Rods.		
400 Tons American Fives	52.00	cash.
250 Tons American Fives	52.50	cash.
New Steel Rails.		
3,000 Tons New Steel Rails	35.50@36.00	cash.
Spiegel.		
100 Tons, 20 per cent., Pittsburg	42.00	cash.
Bloom Ends.		
1,000 Tons Bloom Ends	26.00	cash.
200 Tons Bloom Ends	26.00	cash.
Skelp Iron.		
300 Tons Narrow Grooved	1.87½	4 mo.
300 Tons Sheared Iron	2.25	4 mo.
250 Tons Wide Grooved	1.75	4 mo.
Ferro-Manganese.		
100 Tons 70 per cent., Seaboard	85.00	cash.
100 Tons 80 per cent. Pittsburg	103.00	cash.
50 Tons 80 per cent. Pittsburg	105.00	cash.
Old Iron and Steel Rails.		
800 Tons Old Steel, various lengths	24.00	cash.
500 Tons American Ts	28.00	cash.
Scrap Material.		
600 Tons No. 1 Wrought Scrap, net	24.00	cash.
300 Tons Old Iron Axles, net	30.00	cash.
200 Tons Selected Axles, net	35 00	cash.
150 Tons Cast Scrap, gross	17.50	cash.
100 Tons Leaf Springs, net	25.00	cash.
100 Tons Old Rails, American Ts, gross	28.50	cash.

Prices.

Coke or Bituminous Pig—		20% Spiegel at Pittsburg	42.00@
		Muck-Bar	30.00@30.50
Foundry No. 1	$20.00@20.25	Steel Blooms	36.50@36.75
Foundry No. 2	19.00@19.25	Steel Slabs	36.00@36.50
Gray F. No. 3	18.00@18.50	Steel Cr'p Ends	25.00@26.00
" No. 4	@17.50	Steel Bl. Ends	25.00@26.00
White	17.00@17.25	Ferro-Man., 80%, seaboard,	96.00@96.50
Mottled	17.00@17.25		
Silvery	18.25@21.00	Steel Billets	36.50@37.00
Bessemer	23.50@24.50	Old Iron Rails	27.50@28.00
Low Phos	27.50@28.00	Old Steel Rails	23.00@24.00
Charcoal Pig—		No. 1 W. Scrap	23.00@24.00
		No. 2 W. Scrap	@19.00
Foundry No. 1	23.50@24.50	Steel Rails	36.00@
Foundry No. 2	22.00@22.75	" light sec	36.00@39.00
Cold-Blast	25.00@ 9.00	Bar Iron, nom.	1.90@ 1.95
Warm Blast	24.00@25.00	Iron Nails	2.50@ 2.30
10 + 12% Spiegel at seaboard	30.00@31.00	Steel Nails	2.50@ 2.30
		Wire Nails	2.90@3.00

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Jan. 31.

Heavy Chemicals.—A strong consumptive demand for soda ash and alkali continues to characterize this market. Caustic soda has also improved largely in consequence of decreased stocks on both sides of the Atlantic. During the month closing this evening, a firm of importers has twice been able to sweep the market clean of all supply of the higher tests. During the week under review, prices for 70 and 74 per cent. caustic soda have advanced 10 to 15 cents per hundred lbs. The closing quotations for 70 and 74 per cent. are 2·60c. to 2·65c; 60 per cent. is also sympathetically firm at 2·67½c. to 2·70c. The supply at the moment is very light and the demand good. The best information obtainable at present does not afford an opportunity to determine whether or not this advance is likely to be permanent. While stocks at primary points are light, it is possible that this has been caused by restriction of the output of a number of the works.

The demand for new alkali continues large. The glassmakers' strike is apparently nearly at an end, and glass-makers are in the market for large quantities of soda ash and alkali. For the refined alkali, 58 per cent., $1.40 has been paid, and quotations range according to quantity from $1.37½ to $1.42½. For carbonated soda ash, 48 per cent. is also very firm at $1.45@$1.50 for forward delivery. We understand that small lots on the spot have been sold as high as $1.75.

A light business in caustic soda ash is reported at about $1.37½ for 48 per cent. Most of the business, however, is in carbonated ash, and the quotations for caustic soda are more or less nominal.

Bleaching Powder.—The market is said to show a better feeling, but quotations are practically unchanged at $1.45@$1.50. Sal soda also shows some improvement. Ruling quotations are ·92½@·95c. for future delivery and .95@1c. on the spot. The supply here is limited.

Hyposulphite of soda rules at $1.50 per cwt. in casks and $1.16 in kegs.

Acids.—The first month of the year closes with a quiet market for the principal description of acid. The volume of business probably does not exceed that of the corresponding month in 1889, but as prices are higher, manufacturers are well satisfied. "January," they philosphically explain, "is always a quiet month and we could not have expected a large business, particularly as consumption was unusually large just before the close of 1889. No new topics of interest have been developed in the trade during the week. The Knickerbocker Chemical Company expects to open its business offices shortly and the necessary arrangements to this end are now being made.

Fertilizing Chemicals.—The large sales of dried blood to which we referred last week seem to have pretty generally depleted the spot supply of this kind of ammoniacal material, but prices, while firmly maintained, show no advance. There is a light demand for potashes for current wants. Ruling prices are as follows: Azotine, $1.90@$2.00; dried blood, low grade, $1.85@$1.92½; high grade, $1.92½@2.00. Tankage, high grade, 9 to 10 per cent. ammonia and 15 to 20 per cent. phosphate, $20@$21 per ton, and low grade, 7 to 8 per cent. ammonia and 25 to 30 per cent. phosphate, $18.50. Fish scrap, $21.50@$22 per ton, f.o.b. factory. Sulphate of ammonia at $3.12½@$3.17½ per cwt. Concentrated tankage, $1.90@$2.00. Refuse bone-black, guaranteed 70 per cent. phosphate, $20 per ton. Dissolved bone-black is 90@92½c. per unit for available phosphoric acid, and acid phosphate 80c. per unit for available phosphoric acid. Steamed bones, unground, $20@$23; ground, $25@$26.

Charleston rock, undried, $5.75 per ton; kiln dried, $6.75@$7 per ton, both f.o.b. vessels at the mines. Freights by sail from Charleston to New York, $3@$3.25 per ton. Charleston rock, ground, $11.50@$12, ex-vessel at New York.

Double manure salts, 48 to 51 per cent. sulphate of potash, for 1890 shipment, $1.12½ per 100 pounds; high grade manure salts, basis 90 per cent. sulphate of potash, $2.37½ per 100 pounds. These prices are for invoices of 50 tons, based on foreign analyses and foreign invoice weights, exship, New York.

Muriate of Potash.—There have been arrivals of 500 tons within the week, all of which, according to the syndicate's sales agents, have passed into second hands. For current business the syndicate price of $1.80 per 100 pounds, continues to be quoted.

Kainit.—It is estimated that the spot supply does not exceed 40 tons, which is held at about $11 per ton. The demand is light and the trade presents no new features of interest.

Brimstone continues quiet and weak, at $18.50 for best unmixed seconds.

Lower quotations are also reported for nitrate of soda. It is said that lots have been offered exvessel at this port as low as $1.85 per 100 pounds.

NOTES OF THE WEEK.

In the Maryland state legislature Senator Stake has introduced a bill to regulate the sale of fertilizers by providing a penalty for the sale of spurious goods. It also provides that all dealers shall take out a license, and that any man shall have the right to have the goods analyzed at the Maryland Agricultural College, and that the cost of such analysis shall be paid out of the revenue derived from the issuing of dealers' licenses. The dealer and manufacturer are also required to have printed on the bags a correct chemical analysis of the goods. The printing of a false analysts shall be a violation for which the dealer will be subjected to a fine of $200.

The English Fertilizer Market.

(Messrs. Couper, Millar & Co.'s Report.)

LONDON, Jan. 16, 1890.

The "corner" in phosphates becomes daily more acute, and it is hard to say how manufacturers' wants are to be supplied during the spring months. Long prices are being paid by continental buyers for high test material, and very little obtainable, while medium and low test is scarce, the strike of the coal workers on Continent having actually shut up some of the works *pro tem.*, which tends to aggravate the situation, they pleading *force majeure* as a reason for non-delivery on existing contracts.

Mineral Phosphates.—South Carolina offering sparingly at 11d.@11½d. per unit, according to port. Somme continues scarce; indeed, there is very little available for early delivery of any test. Canadian inquired for, but raisers are not disposed to sell yet at even 1s. 3d. per unit for 80 per cent., with one-fifth of a penny rise, basis London delivery. Belgian, owing to the coal strikes, is, generally speaking, off the market at present. Aruba is not offered, and the much-prized Curacoa does not come forward. Cambridge and Bedford coprolites wanted, but what little is raised is consumed in the district.

Bone Ash, Bones and Meal.—There has been a good inquiry for ash from the outports, and several cargoes have changed hands at £5 to £5 5s., basis 70 per cent. Cargoes of bones from River Plate have been directed largely to the United States, while there is a good inquiry for U. K. at about £5 10s. per ton. Indian bone meal has been selling at £5 12s. 6d per ton.

Sulphate of ammonia steady at £12 to £12 2s. 6d.

Nitrate of soda dull at £8 7s. 6d. spot for ordinary, £8 15s. refined.

Ammoniacal Materials—Fish guano well sold forward, and to-day's quotations are 10s. and 1s. 3d. in buyers' bags; ground hoofs and horns command about 9s. 9d.@10s. per unit of ammonia; dried blood continues in short supply at about 11s. 6d. per unit.

Muriate of Potash—We quote at £7 12s. 6d. on 80 per cent. in bags; kainit at 32s. in f.o.b. Hamburg in lots of not less than 50 tons, net cash, Stassfurt weights and sampling.

Liverpool. Jan. 15.

(Special Report by Messrs. J. P. BRUNNER & Co.)

Chemicals.—Heavy chemicals continue in good request, and in most cases values are moving upward.

Soda Ash.—The market is bare for January delivery, and there is very little to be had for next month. The nearest values are 1⅛d. to 1⅜d. for carbonated and caustic ash according to brand, but the difficulty is to find any makers who are in the position to book fresh orders for at least a month ahead.

Soda crystals are in demand, and sales have been made at £2 15s., while £2 17s. 6d. is generally asked at the close.

Caustic soda is meeting with a large inquiry and higher prices paid. There is little offering on the spot, and the market is somewhat excited. Sixty per cent. is in request and a fair business done at £7, and not easy to buy at this figure, 5s. per ton more money being generally asked.

Seventy per cent is also inquired for and transactions reported at £7 17s. 6d.@$8 and nothing offering at the close and under the higher figure 74 per cent. A number of American orders have been placed at £8 12s. 6d.@£8 15s., and it is doubtful if the higher figure would now be accepted, £9 being now generally asked. Seventy-six per cent., £9 5s.@£9 10s.

Bleaching powder.—The home demand reported in our last has fallen off. Buyers have apparently filled their requirements for the present, and the market is rather weaker in consequence. Hardwood is only in limited request, but at the same time there is little offering and £5 12s. 6d.@£5 15s. represent nearest spot values.

Chlorate of potash in request and sales made at 4½d. up to 5d., the latter figure being paid for a special brand.

Bicarb soda is still scarce at £5 5s. per ton and upward for one cwt. kegs, according to brand and quantity, with usual allowances for larger packages.

Sulphate of ammonia dull and easier, £12 per ton being now nearest spot value for good gray, 24 per cent. f. o. b. Liverpool.

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, Jan. 31.

Much interest has been felt in building material circles in the National Convention of Builders which has been in session during the week at St. Paul. The interest, however, has been greater in the Mechanics and Traders' Exchange than in the Building Material Exchange, as the former is the sole representative of New York City in the National Association of Builders. However, the subjects under discussion at St. Paul this week were of widespread importance. The New York delegates who left here for St. Paul early last Friday were as follows: Richard Deeves, A. J. Campbell, A. S. Dickensen, John M. Canada, Charles A. Cowan, John J. Roberts and W. C. Smith; the alternates, O. T. Mackey, E. W. Fisher, Gustavus Isaacs, Henry W. Redfield, Jacob S. Browne, B. J. B. Mulry and A. E. Stone.

As was anticipated, there was an excited discussion over the eight-hour question. On the closing day of the convention a resolution was adopted by a vote of 111 to 4, leaving to the local bodies the adjustment of the number of hours of labor, as circumstances and conditions by which they were surrounded may dictate; but the convention placed itself firmly on record in the matter by saying "we do believe that this body should persistently urge upon all local bodies that the thorough establishment of a system of payment by the hour is an absolutely necessary safeguard." Resolutions were also adopted recommending, in view of the probable adoption of the eight-hour day, that all contracts and estimates be made to meet the altered conditions which the general adoption of this standard number of hours would entail.

Brick.—The week has been a very quiet one in the brick market, with no important variations in prices, and cargoes are coming forward as regularly as heretofore. The demand has materially improved and current receipts are ample for ordinary requirements. For best quality of Haverstraw brick $7 is about the ruling price. Quotations on other grades are proportionately lower.

Stone.—At the hearing before the Ways and Means Committee of Congress on the tariff question, Congressman Morse, of Massachusetts, on behalf of the granite manufacturers and stone workers of his State, made a strong plea for an advance in the duty on granite. He pointed to the competition of Scotch granite which is quarried with cheaper labor, and said if the duty on granite was reduced there would be but one alternative to the granite manufacturers of New England, viz., either to close their establishments and turn their workmen out of employment or reduce their labor to the level of the laboring men of Europe. The tariff bill which passed the Senate at the last session called for an advance of the present duty of 25 per cent. He thought that the duty should be advanced to 50 per cent.

Slate.—If all the projects that have been attributed to the Lehigh Valley Railroad Company are carried out, the Pennsylvania, Poughkeepsie & Boston Railway, from Slatington, in the heart of the Pennsylvania slate district, to the Poughkeepsie bridge, will be under the control of the Lehigh Valley Company. In order to increase the traffic over this line, it is said that the various railway companies interested will greatly aid in the development of the Slatington deposits. A special dispatch from Easton, Pa., gives the following interesting information: The slate production in the Bangor and Pen Argyl region for 1890 will be much larger than last year, unless something unforeseen should occur. When the new openings are in operation 144 shanties will be busy, giving employment to about 860 men, or about 200 more than had been employed last year. The number of squares of roofing slate that will be produced, basing the estimate upon 120 squares per month to a shanty, which is a fair average, and allowing ten months' good working time, will be 172,800 squares, or about 3,450 car loads, slate sufficient to cover 400 acres of building.

IMPORTS AND EXPORTS OF METALS AT NEW YORK JANUARY 18 TO JANUARY 25 AND FROM JANUARY 1.

IMPORTS.

	Week.	Year.
Spelter.	Tons.	Tons.
Amer. Metal Co....	25	25
Meyer, G. A. & E..	.....	9
Muller, Schall & Co.	.....	69
Total.....	25	103
Corres. date, 1889..	.....	50
Pig Lead.	Lbs.	Lbs.
Schultz & Co., A..	.....	98
Total.....	.....	98
Corres. date, 1889..	.....	.....
Tin.	Tons.	Tons.
Amer. Metal Co....	100	100
Crooks & Co., R....	25	25
Naylor & Co.....	150	150
Phelps, Dodge & Co.	50	50
Townsend, & Co., J. R.	30	30
Total.....	355	355
Corres. date, 1889..	.....	.....
Tin Plates.	Boxes.	Boxes.
Bruce & Cook.....	745	6,623
Byrne & Son.....	.....	1,000
Central Stamp. Co.	1,002	13,151
Coddington & Co...	3,665	9,375
Cohn & Co	223	459
Con. Fruit Jar Co.	.....	120
Corbiere F. & Co...	.....	380
Cort & Co.....	1,379	14,277
Crooks & Co.....	.....	2,996
Dickerson, V. D. & Co.	.....	22,791
Iron Clad Mfg. Co.	107	267
Lalance & G. M. Co.	.....	1,138
Merchant & Co.....	617	3,679
Mersick & Co.....	272	891
Morewood & Co....	2,000	8,892
Pratt Mfg. Co.....	.....	3,134
Phelps, Dodge & Co	2,089	20,765
Shepard & Co.....	.....	789
Taylor, N. & G.....	40	40
Thomson & Co., A. A	503	4,974
Wheeler & Co.....	137	1,346
Whittemore & Co.	1,269	1,488
Wolff & Reesing...	.....	625
Total.....	14,048	118,000
Corres. date, 1889..	.....	75,910
Pig Iron.	Tons.	Tons.
Crocker Bros.....	.....	200
Total.....	.....	200
Corres. date, 1889...	150	850

Steel Blooms, Billets, and Slabs.	Tons.	Tons.
Dana & Co	.....	254
Pope, Jas. E., Jr..	.....	61
Roebling's Sons, J. A.	.....	55
Wolff, & Co., R. H.	.....	60
Total.....	.....	430
Corres. date, 1889..	5	153
Bar Iron.	Tons.	Tons.
Abbott & Co., Jere.	166	169
Bacon & Co.....	.....	45
Crocker Bros.....	.....	77
Downing & Co.....	35	135
Lilienberg, N.....	.....	100
Milne & Co.....	.....	34
Page, Newell & Co..	.....	192
Wilson, J. G.....	.....	2
Total.....	201	754
Corres. date, 1889..	481	496
Scrap Iron.	Tons.	Tons.
Samper & Co., S.	.....	186
Total.....	.....	186
Corres. date, 1889...	20	354

Steel and Iron Rods.	Tons.	Tons.
Abbott & Co.....	277	532
American S. Co....	.....	50
Downing & Co.....	.....	25
Galpin, S. A.....	75	249
Greely & Co, C. S.	.....	30
Jacobus, E. Y.....	2	2
Lundberg, G.....	.....	110
Milne & Co.....	130	180
Muller, Schall & Co.	100	100
Naylor & Co.....	250	250
Page, Newall & Co.	50	50
Roebling's Sons, J. A.	181	361
Wood & Niebuhr..	.....	25
Wolf & Co., R. H..	.....	664
Total.....	1,065	2,628
Corres. date, 1889...	1,032	1,301
Old Rails.	Tons.	Tons.
Frankfort, M.....	246	654
Total.....	246	654
Corres. date, 1889...	.....	510
Spiegeleisen.	Tons.	Tons.
Samper & Co., S.	.....	1,460
Blakely & McLellan....	.....	1,460
Crocker Bros.....	94	1,143
Dana & Co.....	.....	1,146
Foley, F.....	.....	50
Hernshime, L.....	690	1,690
Naylor & Co.....	197	1,420
Perkins, C. L.....	.....	460
Total.....	981	7,249
Corres. date, 1889...	741	909
Iron Ore.	Tons.	Tons.
Baiz, Jacob.....	.....	67
Earnshaw, A.....	.....	742
Total.....	.....	809
Corres. date, 1889..	.....	226

EXPORTS.

Copper.	Pounds.	Pounds.
Abbott & Co., Jere.	248,750	257,540
Amer. Met. Co., Lt.	395,134	478,894
Total.....	643,884	745,394
Corre. date, 1889..	.....	.....
Copper Matte.		
American Metal Co		224,081
Lewisohn Bros. ..	137,872	502,162
Paulsen, Wm.....	.....	978,100
Wil'ms & T'hune.	239,046	1,192,814
Total.....	376,918	2,937,158
Corres. date, 1889...	.....	.....

DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Par	Assessments. Total levied.	Date and amount of last.		Dividends. Total paid.	Date and amount of last.	
1	Adams S. L.	Colo.	$1,500,000	150,000	$10				$555 000	Jan. 1887	.15
2	Alice, S. C	Mont	10,000,000	400.000	25	*	.....	.....	825,000	Dec. 1889	.06¼
3	Alma Cons., G. ...	Idah.	300,000	30,000	10	*	.....	.....	45,000	Dec. 1888	.50
4	Amy & Silversmith, S.	Mon.	.....	341,419	.....	.....	.....	.....	247,530	Aug. 1887	12½
5	Atlantic, C	Mich	1,000,000	40,000	25	$280,000	Apl. 1875	$1.00	580,000	Feb. 1850	1.50
6	Argenta, S.	Nev.	10,000,000	100,000	100	35b,000	July 1889	.10	40,000	Feb. 1880	.20
7	Aspen Mg. & S., S. L.	Colo.	2,000,000	200,000	10	*	.....	.....	360,000	July 1889	.20
8	Aurora, I.	Mich	2,000,000	100,000	20	*	.....	.....	155,000	Oct. 1887	1.87½
9	Badger, S.	Oct.	250,000	50,000	5	.....	.....	.....	25,000	Jan. 1890	.25
10	Bassick, G. S.	Colo.	10,000,000	100,000	100	.....	.....	.....	400,000	Mar. 1884	1.00
11	Belle Isle, S.	Nev.	10,000,000	100,000	100	155 000	Apl. 1889	.10	300,00.	Dec 1889	.05
12	Belcher, G. S.	Nev.	10,400,000	40,000	100	2,822,000	Feb 1889	.50	15,397,200	Apl. 1876	1.00
13	Bellevue Idaho, S. L.	Idah.	1,250,000	125,000	10	120,000	Dec. 1889	.25	187,500	Jan. 1887	10
14	Bodie Con., G. S.	Cal.	10,000 000	100 000	100	575,000	Nov 1889	25	1,295,000	Apl. 1885	50
15	Boston & Mont., G.	Mon	2,500,000	250,000	10	*	.....	.....	520,000	Jun 1888	.10
16	Boston & Mont., C. S.	Mon	2,500,000	100,000	25	*	.....	.....	1,400,000	Jan. 1890	1.00
17	Breece, S.	Colo	5,000,000	200,000	25	*	.....	.....	2,000	Feb. 1880	.01
18	Brooklyn Lead, L. S.	Utah	500,000	50,000	10	*	.....	.....	127,000	July 1887	.06
19	Bulwer, G.	Cal.	10,000,000	100,000	100	130,000	Aug. 1889	.25	175 000	Jan. 1884	.10
20	Bunker Hill & Sull.	Idah.	3,000,000	300,000	10	*	.....	.....	180,000	Mar. 1884	.06⅔
21	Caledonia, G.	Dak.	10,000,000	100,000	100	505,000	May 1885	.15	136,000	Oct 1889	.08
22	Calliope, S.	Colo.	1,000,000	1	1	.....	.....	.....	60,000	Jan. 1890	.01
23	Calumet & Hecla, C.	Mich	2,500,000	100,000	25	1,200,000	.....	.....	33,350,000	Feb. 1890	5.00
24	Carbonate Hill S. L.	Colo.	1,500,000	200,000	10	*	.....	.....	30,000	Apl. 1884	.05
25	Carlisle, G.	N. M.	1,000,000	200,000	5	.....	.....	.....	175,000	Dec. 1888	.12½
26	Castle Creek, G.	Idah.	100,000	100,000	1	.....	.....	.....	51,000	Sept. 1883	.05
27	Catalpa, S.	Colo.	3,000,000	300,000	10	*	.....	.....	297,000	May. 1884	.10
28	Central, C.	Mich	500.000	20,000	25	100,000	Sept 1861	.06	1,950,000	Feb. 1890	1.00
29	Chrysolite, S. L.	Colo.	10,000,000	200,000	50	*	.....	.....	1,650,000	Dec. 1884	.25
30	Colorado Central, S. L.	Colo.	2,750,000	275,000	10	*	.....	.....	406,000	July 1889	.05
31	Confidence, S. L.	Nev.	.....	24,980	.....	287,440	Apl. 1887	.50	199,680	Apl. 1889	1.00
32	Cons. Cal. & Va., G. S.	Nev.	21 600 000	216,000	100	108,000	Jan. 1885	.20	3,358,800	Jan. 1890	.50
33	Contention, S.	Ariz.	12,500,000	250,000	50	.....	.....	.....	2,587,000	Dec. 1884	.25
34	Cop. Queen Cons., C.	Ariz.	1,400 000	140,000	10	*	.....	.....	140,000	Dec. 1888	.50
35	Crescent, S. L. G.	Utah	15,000,000	600,000	25	*	.....	.....	225,000	Oct. 1888	.03
36	Crown Point, G. S.	Nev.	10 000,000	100,000	100	2,850,000	Sept 1880	.50	11,588 000	Jan. 1875	2.00
37	Daly, S. L.	Utah	3,000,000	150,000	20	*	.....	.....	1,350,500	Jan. 1890	.25
38	Deer Creek, S. G.	Idah.	1 000,000	200,000	5	*	.....	.....	20,000	Jun. 1889	.05
39	Deadwood-Terra, G.	Dak.	5,000,000	200,000	25	*	.....	.....	11,000,000	Nov. 1887	.10
40	Derbec B. Grav., G. S.	Cal.	10,000,000	100,000	100	90,000	Dec. 1881	.10	210.000	Oct. 1889	.10
41	Dunkin, S. L.	Colo.	5,000,000	200,000	25	*	.....	.....	390,000	Sept 1889	.05
42	Dunstone, G. S. L.	Mont	1,000,000	200,000	5	*	.....	.....	6,000	Nov. 1888	.03
43	Eclipse	Colo.	100,000	100,000	1	.....	.....	.....	20,000	Nov. 1887	.10
44	Elkhorn, G. S.	Mont	1,000,000	100,000	10	50,000	July 1883	.50	170,000	July 1887	.05
45	Empire Lt., G.	Mont	500,000	100,000	5	.....	.....	.....	70.500	Oct. 1887	.37½
46	Eureka Con., G. S. L.	Nev.	5,000,000	50,000	100	550,000	Jun. 1889	.50	4,955.000	July 1888	.25
47	Evening Star, S. L.	Colo.	500,000	50,000	10	*	.....	.....	1,437,500	Dec. 1889	.25
48	Excelsior, G.	Cal.	10,000,000	100,000	100	500,000	Sept 1885	1.00	875,000	Oct. 1889	.20
49	Father de Smet, G.	Dak.	10,000,000	100 000	100	200,000	Nov 1878	1.00	1,125,000	Dec. 1885	.20
50	Franklin, C.	Mich	1,000,000	40,000	25	220,000	Jun. 1871	.....	1,600,00 C	Jan. 1889	2.00
51	Freeland, G. S. C.	Colo.	5,000,000	200,000	25	*	.....	.....	190,000	July 1886	.10
52	Garfield Lt., G. S.	Nov.	500,000	100,000	5	.....	.....	.....	85,000	Apl. 1888	12½
53	Gould & Curry, G. S.	Nev.	10,800,000	108,000	100	4,434,600	Oct. 1889	.30	3 328,800	Oct. 1870	10.00
54	Grand Prize, S.	Nev.	10,000,000	100,000	100	715,000	Nov. 1889	.30	495,000	Mar 1884	.25
55	Granite, S. L.	Idah.	500,000	500,000	1	*	.....	.....	30,000	Oct. 1889	.02
56	Granite Mountain, S.	Mont	10,000,000	400,000	25	*	.....	.....	7,600,000	Nov. 1889	.50
57	Green Mountain, G.	Cal.	1,250,000	125,000	10	*	.....	.....	212,000	Nov. 1881	.07½
58	Hale & Norcross, G. S.	Nev.	11,200,000	112,000	100	5,086,000	July 1887	.50	1,162,000	July 1888	.50
59	Hecla Con., S. G. L. C.	Mont	1,500,000	30,000	50	.....	.....	.....	1,437,500	Dec. 1889	.50
60	Hel'a Mg & Red, G. S. L.	Mont	3,315,000	663,000	5	*	.....	.....	197,970	July 1886	.06
61	Holmes, S.	Nev.	10,000,000	100,000	100	300,000	Sept 1885	10	75,000	Apl. 1886	.25
62	Holyoke, G.	Idah.	200,000	200,000	1	*	.....	.....	27.000	Feb. 1889	.10
63	Homestake, G.	Dak.	12,500,000	125,000	100	900,000	July 1878	1.00	4,493,750	Jan. 1890	.10
64	Honorine, S. L.	Utah	500,000	250,000	2	37,500	Apl. 1889	.05	125.000	Sept 1887	.05
65	Hope, S.	Mont	1,000,000	100,000	10	*	.....	.....	233,252	Apl. 1888	25
66	Horn-Silver, S. L.	Utah	10,000,000	400,000	25	*	.....	.....	4,050,000	Dec. 1889	.12½
67	Hubert, G.	Colo.	1,000,000	1 mil'n	1	*	.....	.....	247.000	Dec. 1889	.00½
68	Idaho, G.	Cal.	310,000	3,100	100	.....	.....	.....	5,250,500	Dec. 1889	5.00
69	Ideal, S. L.	Colo.	1,500,000	50,000	10	*	.....	.....	15.000	Oct. 1886	.05
70	Illinois, S.	N. M.	100,000	100,000	1	*	.....	.....	45,000	Apl. 1889	.20
71	Independence, S.	Nev.	10,000,000	100,000	100	340,000	Oct. 1886	.20	225,000	Sept 1879	.25
72	Iron Hill, S.	Dak.	2,500,000	250,000	10	134,000	July 1889	.03	156,250	Nov 1887	.07½
73	Iron-Silver, S. L.	Colo.	10,000,000	500,000	20	*	.....	.....	2,500.000	Apl. 1889	.20
74	Jackson, G. S.	Nev.	5,000,000	50.000	100	237,500	Nov 1880	.30	55,000	Jun 1889	.10
75	Jay Gould	Mont	2,000,000	40,000	5	*	.....	.....	365,000	Apl. 1889	.04
76	Jocustitla, S.	Mex.	2,500,000	250,000	10	*	.....	.....	1,200,000	Feb. 1886	.50
77	Jumbo, G.	Colo.	3,000,000	300,000	10	*	.....	.....	35,000	Oct. 1887	.00½
78	Kearsarge, C.	Mich	1,250,000	50,000	25	190,000	Oct. 1887	1.00	100,000	Jan. 1890	2.00
79	Kentuck	Nev.	3,000,000	30,000	100	369,000	Dec. 1889	.30	1,350,000	Dec. 1886	.10
80	La Plata, S. L.	Colo	2,000,000	200,000	10	*	.....	.....	610,000	Sept 1882	.30
81	Leadville Cons., S. L.	Colo.	4,000,000	400,000	10	*	.....	.....	423,000	Apl. 1887	.05
82	Lexington, G. S.	Mont	4,000,000	40,000	100	*	.....	.....	565,000	Jan. 1886	2.00
83	Little Chief, S. L.	Colo.	10,000,000	200,000	50	*	.....	.....	810,000	Jan. 1890	.05
84	Little Pittsburg, S. L.	Colo.	20,000,000	200,000	100	*	.....	.....	1,050,000	Mch. 1890	.50
85	Martin White, S.	Nev.	10,000,000	100,000	100	1,175,000	Jan. 1889	.25	140,000	Dec. 1886	.25
86	Mary Murphy, G. S.	Colo.	350,000	3,500	100	*	.....	.....	175,000	May 1888	5.00
87	Matchless, S.	Colo.	500,000	500,000	1	*	.....	.....	12,500	Dec. 1889	.01½
88	Minnesota, C	Mich	1,000,000	40,000	25	420,000	Apl. 1886	1 00	1,826,000	Mar. 1876	.....
89	Mono, G.	Cal.	5,000,000	50,000	100	102,850	Nov. 1889	.25	12,500	Mar. 1886	.25
90	Montana, Lt., G. S.	Mont	3,300,000	300,000	5	*	.....	.....	2,415,951	Jan 1890	.09
91	Morning Star, S. L.	Colo.	1,000,000	100,000	10	*	.....	.....	785,000	Dec. 1889	.20
92	Moulton, S. G.	Mont	2,000,000	400,000	5	*	.....	.....	380,000	Dec. 1887	.07½
93	Mount Pleasant, G.	Cal.	150,000	150,000	1	*	.....	.....	150.000	Feb. 1887	.30
94	Mt. Diablo, S.	Nev.	5,000,000	50,000	100	137,500	Jun. 1880	2.00	150,000	Oct 1889	.20
95	Napa, Q.	Cal.	700,000	100,000	7	*	.....	.....	350,000	Jan 1890	.20
96	Navajo, G. S.	Nev.	10,000,000	100,000	100	485,000	Apl. 1888	.30	365,000	Apl. 1889	.10
97	New Guston, S.	Colo.	500,000	100,000	5	*	.....	.....	287,500	Dec 1889	.37½
98	N. Hoover Hill, G. S. L.	N. C	900,000	150,000	2½	*	.....	.....	30,000	Dec. 1885	.00½
99	Northern Belle, S.	Nev.	5,000,000	50,000	100	425,000	Jan. 1884	8.00	2,400,000	Apl. 1883	50
100	North Belle Isle, S.	Nev.	10,000,000	100,000	100	400,000	Sept 1889	.20	230,000	May 1888	.50
101	North Star, G.	Cal.	1,000,000	100,000	10	*	.....	.....	250.000	Dec. 1889	.50
102	Ontario, S. L.	Utah	15,000,000	150,000	100	*	.....	.....	10,700,500	Jan. 1890	.50
103	Ophir, G. S.	Nev.	10,000,000	100,000	100	4,159,440	May 1889	.50	1,905,800	July 1882	1.00
104	Original, S. C.	Mont	1,500,000	60,000	25	*	.....	.....	123,000	July 1888	.05
105	Osceola, S.	Mich	1,250,000	50,000	25	480,000	Apl. 1876	1.60	1,272,500	Mar. 1890	1.00
106	Oxford, G.	S. S	136,000	125,000	1	*	.....	.....	73,500	Sept 1888	.02
107	Paradise Valley, G. S.	Nev.	10,000,000	100,000	100	57,000	Apl. 1888	.15	150,000	Apl. 1887	.10
108	Parrot, C.	Mont	1,800,000	180,000	10	*	.....	.....	480,000	Oct. 1889	.05
109	Peacock, S. G. C.	N.M.	2,000,000	200,000	10	*	.....	.....	60.000	Nov. 1886	.....
110	Plumas Eureka, G.	Cal.	1,468,250	140,625	10	*	.....	.....	2,548,046	Oct. 1889	.37½
111	Plutus, G. S. C. L.	Colo.	2,000,000	200,000	10	*	.....	.....	20,000	Feb. 1886	.10
112	Plymouth Con., G.	Cal.	5,000,000	100,000	50	*	.....	.....	2.280.000	Feb. 1890	.20
113	Quicksilver, pref., Q.	Cal.	4,300,00.	43,000	100	*	.....	.....	1,792,982	Feb. 1889	1.50
114	com., Q.	Cal.	5,700,000	57,000	100	*	.....	.....	643,367	July 1882	.40
115	Quincy C.	Mich	1,000,000	40,000	25	200,000	Dec. 1862	.....	5,370,000	Jan. 1890	3.00
116	Republic, C.	Mich.	5,000,000	100,000	50	400,0 .0	Dec. 1883	.30	4,312,587	Jun. 1887	1.25
117	Richmond, S. L.	Nev.	1,350,000	54,000	25	*	.....	.....	99,785	Feb. 1889	.50
118	Ridge, C.	Mich.	500,000	20,000	25	219,939	Mar 1886	.50	585,000	Mar. 1888	.05
119	Robinson Con., S. L.	Colo.	10,000,000	200,000	50	*	.....	.....	100,000	Dec. 1889	.50
120	Robert E. Lee, S. L.	Colo.	10,000,000	500,000	20	*	.....	.....	4,460,000	July 1889	3.00
121	Savage, S.	Nev.	11,200,000	112,000	100	6,542,000	July 1889	.50	7,500	Apl. 1883	.01
122	Shoshone, G.	Idah.	150,000	150,000	1	*	.....	.....	1,598,145	Apl. 1888	.12½
123	Sierra Buttes, G.	Cal.	2,225 000	122,500	10	*	.....	.....	102,000	Jan. 1871	1.00
124	Sierra Nevada, G. S.	Nev.	10,000,000	100,000	100	6,250,000	Oct. 1889	.50	40,000	May 1889	.02
125	Sierra Nevada, S. L.	Idaho	1,000,000	1	1	*	.....	.....	270,000	Apl. 1889	.19
126	Silver Cord, G. S. L.	Colo.	4,500,000	450,000	10	*	.....	.....	1,950,000	July 1887	.25
127	Silver King, S.	Ariz.	10,000,000	100,000	100	80,000	Jan. 1890	.30	50,000	Dec. 1889	.05
128	Silver Mg. of L. V.	N. M.	500,000	500,000	.....	*	.....	.....	50,000	Nov. 1886	.02
129	Silverton, G. S. L.	Colo.	3,000,000	300,000	10	*	.....	.....	3,137,500	Jun 1889	.10
130	Small Hopes Cons., S.	Colo.	5,000,000	250,000	20	*	.....	.....	50.000	Jan 1881	25
131	Spring Valley, G.	Cal.	200,000	200,000	1	50,000	Oct. 1886	.25	3,595,000	Jun. 1888	.05
132	Standard, G. S.	Cal.	10,000,000	100,000	100	25,000	Oct. 1884	.25	155,000	Nov. 1881	.05
133	Stormont, S.	Utah	500,000	500,000	1	*	.....	.....	844.000	Dec. 1887	.20
134	St. Joseph, S.	Mo.	1,500,000	150,000	10	*	.....	.....	9,000	Apl. 1888	.02½
135	Swansea, G.	Colo.	600,000	60,000	10	*	.....	.....	1,205,000	Jan 1890	3.00
136	Tamarack, C.	Mich.	1,000,000	40,000	25	520,000	Apl. 1885	3.00	100,000	Nov 1881	.20
137	Tip Top, S.	Ariz.	10,000,000	100,000	100	250,000	Sept 1883	.25	1,250,000	Apl. 1882	.10
138	Tombstone, G. S. L.	Ariz.	12,500,000	500,000	25	*	.....	.....	97,500	Feb. 1884	.20
139	United Verde, C.	Ariz.	3,000,000	300,000	10	*	.....	.....	37,500	Apl 1886	2.50
140	Valencia, M.	N. H.	150,000	1,500	100	*	.....	.....	272,500	Oct. 1888	.37½
141	Viola Lt., S. L.	Idah.	750,000	150,000	5	*	.....	.....	30,000	Dec. 1889	.05
142	Ward Cons., S.	Colo.	2,000,000	200,000	10	*	.....	.....	1,275,000	July 1887	.10
143	Yankee Girl	Colo.	2,500,000	250,000	10	*	.....	.....	2,184,000	Aug 1871	1.50
144	Yellow Jacket, G. S.	Nev.	12,000,000	120,000	100	5,504,000	Mar 1889	.50	3,300	Jun. 1889	.10
145	Webb City, L. Z.	Mo.	55,000	11,000	5	*	.....	.....	.....	.....	.....

NON-DIVIDEND PAYING MINES

	Name and Location of Company.		Capital Stock.	Shares. No.	Par Value	Assessments. Total levied	Date & am't of last.	
1	Agassis Cons., S. L.	Colo.	$3,500,000	50,000	$50	*	.....	.....
2	Alleghany, S.	Colo.	5,000,000	50 ,000	10	*	.....	.....
3	Alloues, G.	Mich	2,000,000	80,000	25	$737.000	Jan. 1890	.50
4	Alpha Con., G. S.	Nev.	3,000,000	30,000	100	648.750	July 1884	27½
5	Alta, S.	Nev.	10,080,000	100,800	100	2,248,800	Sept 1888	.60
6	Amador, S.	Cal.	400,000	200,000	2	*	.....	.....
7	American Flag, S.	Colo.	1,250,000	125,000	10	300,000	Jun 1877	.10
8	Amity, S.	Colo.	250,000	250,000	1	.....	.....	.....
9	Anglo-Montana, Lt	Mon.	600,000	120,000	5	.....	.....	.....
10	Astoria, G.	Cal.	200,000	100,000	2	.....	.....	.....
11	Barcelona, S.	Nev.	5,000,000	200,000	25	*	.....	.....
12	Bechtel Con., G.	Cal.	10,000,000	100,000	100	173,500	Jan. 1883	.10
13	Belmont, S.	Nev.	5,000,000	50,000	100	735,000	Apl. 1886	.10
14	Best & Belcher, G. S.	Nev.	10,080,000	100,800	100	2,180,590	Jan. 1890	.25
15	Big Pittsburg, S. L.	Colo.	20,000,000	200,000	100	*	.....	.....
16	Bi-Metallic, S.	Mon.	5,000,000	200,000	25	*	.....	.....
17	Black Oak, G.	Cal.	3,000,000	300,000	10	*	.....	.....
18	Boston Con., G.	Cal.	10,000,000	100,000	100	170,000	Nov 1883	.25
19	Bremen, S.	N. M	5,000,000	500,000	10	*	.....	.....
20	Bull Run, S.	Colo.	250,000	250,000	1	*	.....	.....
21	Brunswick, G.	Cal.	2,000 000	400,000	5	*	.....	.....
22	Bullion, G. S.	Nev.	10,000,000	100,000	100	4,007,000	Aug. 1866	.50
23	Calaveras, G.	Cal.	500,000	500,000	1	*	.....	.....
24	Carisa, G.	Wy.	500,000	100,000	5	*	.....	.....
25	Carupano, G. S. L. C.	Ven.	200,000	100,000	2	*	.....	.....
26	Cashier, G.	Cal.	500,000	250,000	2	*	.....	.....
27	Charles Dickens, G. S.	Idah.	1,250,000	250,000	5	*	.....	.....
28	Cherokee, G.	Cal.	1,500,000	150,000	10	*	.....	.....
29	Chollar, S.	Nev.	11,200,000	112,000	100	1,484,000	July 1889	.50
30	Cleveland, T.	Dak.	1,000,000	500,000	2	*	.....	.....
31	Colohis	N. M.	500,000	50,000	10	.....	.....	.....
32	Commonwealth, S.	Nev.	10,000,000	100,000	100	170,000	Nov	1882 .50
33	Comstock, G. S.	Nev.	10,000,000	100,000	100	50 000	Mar.	1887 .15
34	Con. Imperial, G. S.	Nev.	5,000,000	50,000	100	1,462,500	Nov.	1889 .05
35	Con. Pacific, G.	Cal.	6,000,000	60,000	100	192,000	Oct.	1889 .10
36	Cons Silver, S.	Mo.	2,500,000	250,000	10	*	.....	.....
37	Crescent, S. L.	Colo.	3,000,000	300,000	10	*	.....	.....
38	Crocker, S.	Ariz.	10,000,000	100,000	100	125,000	Jun.	1889 .10
39	Crowell, G.	N. C	500,000	500,000	1	*	.....	.....
40	Dahlonega, G.	Ga.	250,000	250,000	1	*	.....	.....
41	Dana, S.	Colo.	5,000,000	500,000	10	*	.....	.....
42	Decatur, S.	Colo.	1,500,000	300,000	5	*	.....	.....
43	Denver City, S. L.	Colo	5,000,000	500,000	10	*	.....	.....
44	Denver Gold, G.	Colo.	300,000	60,000	5	*	.....	.....
45	Durango, G.	Colo.	500,000	500,000	1	*	.....	.....
46	Eastern Dev. Co., Lt.	N. S.	1,500,000	150,000	10	990,000	Mar.	1886 1.00
47	El Cristo, G.	U.S.C	1,000,000	500,000	2	*	.....	.....
48	El Dorado, G	Cal.	1,000,000	250,000	4	*	.....	.....
49	El Talento, G.	S.C	1,000,000	500,000	2	*	.....	.....
50	Empire, S.	Utah	10,000,000	100,000	100	*	.....	.....
51	Eureka Tunnel, S. L.	Nev.	10,000,000	100,000	100	*	.....	.....
52	Exchequer	Nev.	10,000,000	100,000	100	515,000	Apl.	1889 1.25
53	Found Treasure, G. S.	Nev.	10,000,000	100,000	100	30,530	Apl.	1889 2½
54	Gogebic L. Syn., I.	Wis.	5,600,000	200,000	25	*	.....	.....
55	Gold Cup, S.	Colo.	500,000	500,000	1	*	.....	.....
56	Golden Era, S.	Mon.	2 000,000	200,000	10	*	.....	.....
57	Gold Placer, G.	Colo.	5,000,000	200,000	25	229,314	Dec.	1885 .25
58	Gold Rock, G.	Cal.	1,000,000	500,000	2	*	.....	.....
59	Goodshaw, G.	Cal.	10,000,000	100,000	100	*	.....	.....
60	Grand Belt, C.	Tex.	12,000,000	120,000	100	*	.....	.....
61	Grand Duke	Colo.	800,000	80,000	10	*	.....	.....
62	Grand Remance, G.	U.S.C	1,000,000	500,000	2	*	.....	.....
63	Gregory-Bobtail, G.	Colo.	550,000	550,000	1	*	.....	.....
64	Gregory Con., G.	Mon.	3,000,000	300,000	10	*	.....	.....
65	Harlem M. & M. Co. G.	Cal.	1 000,000	200,000	5	*	.....	.....
66	Head Cent. & Tr. S. G	Ariz.	10,000,000	100,000	100	*	.....	.....
67	Hector, G.	Cal.	1,500,000	300,000	5	45,000	Jan.	1889 .15
68	Highland, C.	Mich	500,000	25,000	20	*	.....	.....
69	Hollywood	Cal.	200,000	100,000	2	*	.....	.....
70	Hortense, S.	Cal.	2,000,000	200,000	10	*	.....	.....
71	Huron, C.	Mich	1,000,000	40,000	25	980,000	May	1887 3.00
72	Iron Gold & Silver, S.	N. M.	2,000,000	200,000	10	*	.....	.....
73	Ironton, I.	Wis.	1,000,000	40,000	25	*	.....	.....
74	Iroquois, C.	Mich	1,250,000	50,000	25	*	.....	.....
75	J. D. Reymert	Ariz.	10,000,000	100,000	100	*	.....	.....
76	Jumbo Cons., G. S.	Nev.	11,000,000	110,000	100	1,660,000	Jan.	1889 .10
77	Lacrosse, S.	Colo.	1,000,000	100,000	10	*	.....	.....
78	Lee Basin, S. L.	Colo.	5,000,000	500,000	10	*	.....	.....
79	Mayflower Gravel	Cal.	1,000,000	100,000	10	535,000	Jan	1890 ....
80	May Mazeppa, S.	Colo	500,000	500,000	1	*	.....	.....
81	Medora, G.	Dak	250,000	250,000	1	*	.....	.....
82	Mexican, G. S.	Nev.	10,000,000	100,000	100	2,500,700	Dec.	1889 .25
83	Middle Bar G.	Cal.	400,000	200,000	2	*	.....	.....
84	Mike & Starr, S. L.	Colo	1,000,000	200,000	5	*	.....	.....
85	Mollie Gibson,	Colo.	2,000,000	100,000	2	*	.....	.....
86	Monitor, G.	Colo	100,000	1,000,000	1	*	.....	.....
87	Mutual Mg. & Sm.	W'sh	100,000	1,100,000	1	*	.....	.....
88	Native, C.	Mich	1,000,000	40,000	25	*	.....	.....
89	Neath, G.	Colo.	1,000,000	100,000	10	*	.....	.....
90	Nevada Queen, S.	Nev	10,000,000	100,000	100	250,000	Oct.	1889 .25
91	New Germany, G.	N. S.	100,000	100,000	1	*	.....	.....
92	New Pittsburg, S. L.	Colo.	2,000,000	200,000	10	*	.....	.....
93	N. Commonw'h, S.	Nev.	10,000,000	100,000	100	60,000	Apl.	1889 .10
94	North Standard, G.	Cal.	10,000,000	100,000	100	20,000	Nov	.....
95	Noonday	Cal.	600,000	60,000	10	208,000	Dec.	1881 ....
96	Oneida Chief, G.	Cal.	500,000	125,000	10	*	.....	.....
97	Oriental & Miller, S.	Nev.	10,000,000	400,000	25	*	.....	.....
98	Osceola, G.	Nev.	5,000,000	500,000	10	*	.....	.....
99	Overman, G. S.	Nev.	11,520,000	115,200	100	3,823,460	Dec.	1889 .25
100	Park, S.	Utah	2,000,000	200,000	10	*	.....	.....
101	Peer, S.	Ariz.	10,000,000	100,000	100	155,000	Sept	1889 .10
102	Peerless, S.	Ariz.	10,000,000	100,000	100	370,000	Mar.	1889 .35
103	Phoenix	Ariz	500,000	500,000	1	*	.....	.....
104	Phoenix, G. S.	Ark.	5,000,000	200,000	25	*	.....	.....
105	Phoenix Lead, S. L.	Colo.	100,000	100,000

NEW YORK MINING STOCKS QUOTATIONS.

DIVIDEND-PAYING MINES

NAME AND LOCATION OF COMPANY.	Jan. 25. H.	Jan. 25. L.	Jan. 27. H.	Jan. 27. L.	Jan. 28. H.	Jan. 28. L.	Jan. 29. H.	Jan. 29. L.	Jan. 30. H.	Jan. 30. L.	Jan. 31. H.	Jan. 31. L.	SALES.
Adams, Colo	.29	.....	....	....	....	....	.29	....	.....	.....	....	....	800
Alice, Mont	1.20	.....	....	....	....	....	....	....	.....	.....	....	....	500
Aspen, Colo	....	....	....	....	7.50	....	....	....	.....	.....	....	....	100
Basic, Colo	....	.....	....	....	....	....	....	....	.....	.....	....	....	.....
Belcher	....	.....	....	....	....	....	....	....	.....	.....	....	....	.....
Belle Isle, Nev	....	.....	....	....	....	....	....	....	.....	.....	....	....	.....
Bodie Cons., Cal	....	.....	....	....	....	....	....	....	.....	.....	....	....	.....
Bes. & Mont., Mont	....	.....	....	....	....	....	....	....	.....	.....	....	....	.....
Breece, Colo	....	.....	....	....	.30	.28	.31	.30	34	....	....	....	400
Bulwer, Cal	....	.....	....	....	....	....	....	....	.....	.....	....	....	.....
Caledonia, Dak	....	.....	....	....	....	....	....	....	.....	.....	....	....	.....
Calumet & Hecla	....	.....	....	....	....	....	....	....	.....	.....	....	....	.....
Colorado Central	....	.....	....	....	....	....	....	....	.....	.....	....	....	.....
Cons. Cal. & Va., Nev.	4 85	4.75	4.90	.....	4 95	4.90	4 95	....	5 00	4 95	....	....	1,300
Crown Point, Nev	....	.....	....	....	1 65	....	1.60	....	1.60	....	....	....	800
Deadwood, Dak	....	.....	....	....	....	....	1.50	....	1.60	....	....	....	50
Dunkin, Colo	.75	.70	....	....	....	....	....	....	....	....	....	....	200
Eureka Con	....	....	....	....	....	....	....	....	3.50	....	....	....	0
Father de Smet, Dak	....	.....	.40	....	....	....	....	....	.....	.....	....	....	200
Franklin, Mich	....	.....	....	....	....	.00	....	....	.....	.....	....	....	.....
Freeland, Colo	.65	.64	.64	.60	.74	....	.63	.62	.66	.62	.63	.62	14,65
Gould & Curry, Nev	1.50	....	....	....	....	....	....	....	....	....	....	....	100
Hale & Norcross, Nev	....	.....	....	....	....	....	....	....	.....	.....	....	....	.....
Holyoke, Id	....	.....	....	....	....	....	....	....	.....	.....	....	....	.....
Homestake, Dak	....	.....	....	....	....	....	....	....	.....	.....	....	....	.....
Horn-Silver, Ut	2 50	2.45	2 45	....	....	.40	2.50	2.45	2.45	....	....	....	1,100
Iron Hill, Dak	....	.....	.50	....	.45	....	....	....	.....	.....	....	....	665
Iron Silver, Colo	....	.....	....	....	....	....	....	....	.....	.....	....	....	.....
Leadville C., Colo	....	.....	.12	.11	.12	....	.4	.11	.....	.....	....	....	2,825
Little Chief, Colo	....	.....	....	....	....	.24	....	....	.....	.....	....	....	500
Little Pittsburg, Colo	....	.....	....	....	....	....	....	....	.....	.....	....	....	.....
Mono, Cal	.40	.....	....	....	....	....	....	....	.....	.....	....	....	200
Mt. Diablo, Nev	....	.....	....	....	....	....	....	....	.....	.....	....	....	.....
Navajo, Nev	....	.....	....	....	....	....	....	....	.35	....	....	....	100
North Belle Isle, Nev	....	.....	....	....	....	....	....	....	.....	.....	....	....	.....
North Star, Cal	....	.....	....	....	....	39.00	....	....	.....	.....	....	....	.....
Ontario, Ut	....	.....	....	....	40 00	....	40 00	....	.....	40.00	....	....	240
Opnir, Nev	....	.....	....	....	....	....	....	....	.....	.....	....	....	.....
Osceola, Mich	....	.....	....	....	....	....	....	....	.....	.....	....	....	.....
Plutus, Colo	....	.....	....	....	....	....	....	....	.....	.....	....	....	.....
Plymouth, Cal	....	.....	....	....	....	....	....	....	.....	.....	....	....	.....
Quicksilver, Pref	....	.....	....	....	....	....	....	....	.....	.....	....	....	.....
Com	....	.....	....	....	6.88	....	6.88	....	.....	8.75	....	....	1 0
Robinson Cons. Colo	....	.....	....	....	....	....	....	....	.....	.....	....	....	.....
Savage, Nev	....	.....	....	....	....	....	....	....	.....	.....	....	....	.....
Sierra Nevada, Nev	....	.....	....	....	....	....	....	....	.....	.....	....	....	.....
Silver Cord	.73	.72	.73	....	....	....	.70	....	.....	.....	....	....	900
Silver King	.30	.....	....	....	....	.24	.21	.28	.25	.29	....	.30	.....
Silver Mg. of L. V	....	.....	....	....	....	....	....	....	.....	.....	....	....	.....
Small Hopes, Colo	.85	.....	....	....	....	.85	....	....	.....	.....	....	....	600
Standard, Cal	....	.....	5	....	....	....	....	....	.....	.....	....	....	00
Stormont, Utah	....	.....	....	....	....	....	....	....	.....	.....	....	....	.....
Tamarack, Mich	....	.....	....	....	....	....	....	....	.....	.....	....	....	.....

NNN-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	Jan. 25. H.	Jan. 25. L.	Jan. 27. H.	Jan. 27. L.	Jan. 28. H.	Jan. 28. L.	Jan. 29. H.	Jan. 29. L.	Jan. 30. H.	Jan. 30. L.	Jan. 31. H.	Jan. 31. L.	SALES.
Alpha	....	....	....	....	....	....	....	....	....	....	....	....	.....
Alta, Nev	1.40	....	....	....	....	....	....	....	....	....	1.35	....	200
Andes, Nev	....	....	.65	.....	....	....	....	....	....	....	....	....	400
Amador, Cal	....	....	....	....	....	....	....	....	....	....	....	....	.....
American Flag, Colo	.04	....	....	....	....	....	....	....	....	....	....	....	.....
Astoria, Cal	.12	.09	.11	.10	.05	....	.04	....	....	....	.04	....	1,700
Barcelona, Nev	.28	....	....	....	....	....	.08	....	....	....	.07	....	11,900
Bechtel, Cal	....	....	....	....	....	....	....	....	....	....	....	....	200
Best & Belcher, Nev	....	....	....	....	....	....	....	....	....	....	....	....	.....
Brunswick, Cal	....	....	.01	....	....	....	....	....	....	....	....	....	.....
Bullion, Nev	.70	.....	.7	....	....	....	....	....	....	....	....	....	.....
Cashier, Colo	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Castle Creek, Id	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Cholla, Nev	....	.....	....	....	....	....	.02	....	....	....	....	....	400
Col. & Beaver, Id	....	.....	....	....	....	....	....	....	....	....	2 50	....	100
Commonw'th, Nev	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Comstock T., Nev	....	.....	....	....	....	....	....	....	....	....	....	....	.....
" bonds	30.00	.....	32.00	....	....	....	....	....	32.00	....	32 00	....	200
" scrip	....	.....	....	....	....	....	....	....	....	....	32.00	....	10,6 0
Del Monte, Colo	.80	.....	....	....	....	....	....	....	....	....	....	....	400
El Cristo, Rep. of Col	1.85	1.68	1 75	1.65	1.80	1.70	1.85	1.75	1.80	....	1.75	....	4,700
Excelsior, Cal	.73	.....	....	....	....	....	....	....	....	....	....	....	1,000
Exchequer Nev	.65	.....	....	....	....	....	....	....	....	....	....	....	100
Gold Stripe, Cal	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Julia, Nev	.35	.....	.35	....	....	....	....	....	....	....	....	....	.....
Kingst'n & Pemb'ke	....	.....	....	....	....	....	....	....	....	....	....	....	1,300
Kossuth, Nev	....	.....	....	....	....	....	....	....	....	....	....	....	100
Lacrosse, Colo	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Lee Basin, Colo	....	.....	....	....	....	....	....	....	....	....	.07	.08	1,500
Mexican, Nev	....	.....	....	....	....	....	....	....	2.70	....	....	....	.....
Middle Bar, Cal	....	.....	....	....	....	....	....	....	....	....	2 90	....	300
Moniter, Colo	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Mutual Sm. & M. Co	....	....	1 65	....	....	....	....	....	1.65	....	1.70	....	1.65
Nevada Queen, Nev	.80	.....	....	....	....	....	....	....	....	....	....	....	100
N. Com'nw'th, Nev	.85	.....	....	....	....	....	....	....	....	....	....	....	150
Occidental, Nev	....	....	.75	....	....	....	....	....	.80	....	....	....	100
Oriental & Mil., Nev	.06	....	.06	....	.07	....	....	....	....	....	.07	....	700
Overman, Nev	....	.....	....	....	.90	....	....	....	....	....	....	....	6,500
Phœnix of Ariz	.62	....	.70	.60	.80	.60	.84	.75	.84	.80	.87	.80	28,850
Potosi, Nev	1.80	....	....	....	....	....	1 80	....	1.75	....	....	....	350
Rappahann'k, Va	....	.....	....	....	.06	....	.05	....	....	....	.05	....	600
S. Sebastian, San S	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Scorpion, Nev	....	.....	....	....	....	....	.30	....	....	....	....	....	300
Shoshone Idaho	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Silver Hill, Nev	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Silver Queen	....	.....	.06	....	....	....	....	....	....	....	....	....	100
Stanislaus, Cal	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Sutro Tunnel, Nev	....	.....	....	....	....	....	....	....	....	....	....	....	.....
" Trust Cert	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Sutter Creek, Cal	1.80	1.75	2. 5	1.80	2.00	....	2 25	2.00	2.20	1 80	2.10	2.00	9.80
Union Cons., Nev	....	....	....	....	....	....	....	....	....	....	....	....	.....
United Copper	....	....	....	....	....	....	....	....	....	....	....	....	.....
Utah, Nev	....	.....	....	....	....	....	....	....	.75	....	....	....	200
									.75	....			

*Ex. dividend. †Dealt in at the New York Stock Ex. Unlisted securities ‡Assessment unpaid. Dividend shares sold, 27,790 Non-dividend shares sold, 84,950. Total, New York, 112,240.

BOSTON MINING STOCK QUOTATIONS.

NAME OF COMPANY.	Jan. 24.	Jan. 25.	Jan. 27.	Jan. 28.	Jan. 29.	Jan. 30.	SALES.
Atlantic, Mich	....	....	14 75	....	....	14.00	70
Bodie, Cal	....	....	....	....	....	....	.....
Bonanza Developm't	.95	.95	.95	.93	.90	.90	1,850
Bost. & Mont., Mont	50 00	49.75	50.00	49 75	50 00	40 50	49 50	48.25	48 5	47.00	....	....	8,672
Breece, Colo	....	....	....	....	....	30	....	....	....	....	....	....	100
Calumet & Hecla, Mich	263	.....	....	260	259½	259	249	250½	....	256	255	....	140
Catalpa, Colo	.17	.....	....	.46	....	....	....	.16	....	....	....	....	745
Central, Mich	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Chrysolite, Colo	....	.....	....	....	....	....	....	....	....	....	....	....	200
Con. Cal. & Va., Nev	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Dunkin, Colo	.70	.....	.70	.55	....	.55	....	.55	....	.15	....	....	1,550
Enterprise	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Franklin, Mich	15 25	14.75	14.25	15 25	14.75	15.00	14.25	15.00	14.50	15.00	14 75	....	2,257
Hale & Norcross, Nev	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Honorine, Utah	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Little Chief	.25	.....	....	....	....	....	....	....	....	....	....	....	200
Little Pittsburg, Colo	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Martin White, Nev	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Moulton	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Napa, Cal	....	.....	4 25	....	....	....	....	4.50	....	....	....	....	104
Ontario, Utah	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Osceola, Mich	28.00	27.50	27.75	27 50	29 00	27.88	30.00	20.00	31.00	29.50	30.50	29.75	8,320
Pewabic, Mich	9 75	9.00	....	....	....	....	....	....	....	....	8.50	....	395
Quincy, Mich	72 00	.....	....	....	72 00	71 50	72.00	70.00	74.00	....	....	....	152
Ridge, Mich	1.25	1.20	....	....	1.25	.....	1.25	..	1.20	....	1.25	1.13	2,400
Sierra Nev., Nev	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Silver King, Ariz	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Standard, Cal	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Tamarack, Mich	....	.....	....	159	....	....	....	159½	158½	156	....	....	35

NAME OF COMPANY.	Jan. 24.	Jan. 25.	Jan. 27.	Jan. 28.	Jan. 29.	Jan. 30.	SALES.
Alloues, Mich	1.88	1.35	2 00	1.95	2.05	1.88	....	.....	2.00	1.88	2.00	....	2,160
Arnold, Mich	....	.....	....	....	....	....	....	.....	....	....	....	....	.....
Astec, Mich	.10	.....	.09	....	....	....	....	.....	....	....	....	....	400
Bowman	....	.....	....	....	....	....	....	.....	....	....	....	....	.....
Butte & Bost., Mont	14.75	14.25	14.25	....	14.75	....	....	.....	....	....	14.00	14.00	855
Canada	....	.....	....	....	....	....	....	.....	....	....	....	....	.....
Cashier, Colo	....	.....	....	....	....	....	....	.....	....	....	....	....	.....
Crescent, Colo	.08	....	....	....	....	....	....	.....	....	....	....	....	.....
Dana	....	.....	....	....	....	....	....	.....	....	....	....	....	200
Don Enrique, N. M	.32	.31	....	....	....	....	.30	.....	.30	....	....	....	.....
El Crusty, S. A	1.75	.....	....	....	1.78	....	....	.....	....	....	....	....	540
Hanover, Mich	....	.....	....	....	....	....	....	.....	....	....	....	....	250
Humboldt, Mich	....	.....	....	....	.12	....	....	.....	.12	....	....	....	.....
Hungarian	....	.....	....	....	....	....	....	.....	....	....	....	....	350
Huron, Mich	....	.....	....	....	4.00	....	....	.....	....	....	....	....	.....
Kearsarge	9.75	9.50	9.75	9 63	....	....	9.50	9.00	9.13	9.00	9.38	9.25	100
Mesnard, Mich	....	.....	.50	....	....	....	.50	.....	....	....	....	....	1,675
National, Mich	2.75	2.50	....	....	....	....	....	2.50	....	....	....	....	200
Orien & Miller, Nev	....	.....	....	....	....	....	....	.....	....	....	....	....	175
Phœnix, Ariz	....	.....	....	....	....	....	.65	....	.70	....	....	....	.....
Pontiac, Mich	....	.....	....	....	....	....	....	.....	....	....	....	....	400
Rappahannock, Va	....	.....	....	....	....	....	....	.....	....	....	....	....	.....
Rockland	....	.....	....	....	....	....	....	.....	....	....	....	....	.....
Santa Fe, N. Mex	1.48	....	1.50	1.48	1.48	1 45	1 48	1.35	1.40	1.28	1.38	1 35	7,130
Security, Colo	....	.....	....	....	....	....	....	.....	....	....	....	....	.....
Shoshone, Idaho	....	.....	....	....	....	....	....	.....	....	....	....	....	.....
South Side, Mich	....	.....	....	....	.20	....	.20	.....	....	....	....	....	300
Star	....	.....	....	....	....	....	....	.....	....	....	....	....	.....
Washington, Mich	....	.....	....	....	....	....	....	.....	....	....	....	....	.....

Boston: Dividend shares sold, 26,990. Non-dividend shares sold, 14,735. Total Boston, 41,725.

COAL STOCKS.

NAME OF COMPANY.	Par val. of sh'rs.	Jan. 25 H.	Jan. 25 L.	Jan. 27. H.	Jan. 27. L.	Jan. 28. H.	Jan. 28. L.	Jan. 29. H.	Jan. 29. L.	Jan. 30. H.	Jan. 30. L.	Jan. 31. H.	Jan. 31. L.	Sales.
American Coal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cambria Iron	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cameron Coal & Iron Co	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ches. & O. RR	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chic. & Ind. Coal RR	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do. pref	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Col. & Hocking Coal	100	18⅝	18¼	20	18⅛	19⅝	18¾	.....	.....	.....	.....	.....	.....	1,660
Col., C. & I	100	49⅞	49	50¾	49¾	50	48⅛	49⅛	48	49⅞	48⅛	49⅜	48¾	33,330
Consolidation Coal	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	23	.....	100
Del. & H. C	100	.....	.....	151½	150	151	150¼	151	150⅛	152⅛	150¾	152¼	151⅛	7,805
D., L. & W. RR	50	137½	137⅛	137⅞	136⅜	136½	136	136¼	135⅝	136	135½	136½	135⅝	69,096
Hocking Valley	100	23⅞	23⅜	23¾	22¼	23	22	.....	.....	23¼	23	22¼	.....	5,206
Hunt. & Broad Top	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do. pref	.....	.....	.....	.....	.....	44¾	.....	.....	.....	.....	.....	.....	.....	34
Illinois Coal & Coke Co	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	28⅝	28	600
Lehigh C. & N	50	52½	52¼	52¼	52	52⅛	52	52⅛	.....	52¼	.....	.....	.....	2,986
Lehigh Valley RR	50	52¾	.....	52¾	52½	52⅞	52⅝	53¼	52¾	53¼	53⅛	.....	.....	3,254
Marshall Con. Coal	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mahoning Coal	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do. pref	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maryland Coal	100	15¾	.....	13⅛	.....	14⅛	.....	.....	.....	.....	.....	.....	.....	500
Morris & Essex	100	.....	.....	151	150	.....	.....	.....	.....	.....	.....	.....	.....	135
New Central Coal	50	.....	.....	10½	.....	10¾	.....	.....	.....	.....	.....	.....	.....	360
N. J. C. RR	100	122¼	122	122⅛	121	121	119⅞	120½	119¾	120⅜	119	119½	119⅛	7,445
N. Y. & S. Coal	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
N. Y., Susq. & Western	100	.....	.....	7⅝	7⅛	7⅝	.....	7⅝	.....	7⅛	.....	7⅛	.....	625
Do. pref	100	31½	.....	31½	.....	31½	.....	30	.....	.....	.....	.....	.....	300
N. Y. & Perry C. & I	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Norfolk & Western R.R.	50	.....	.....	22	21¾	22⅜	22	22⅜	22¼	.....	.....	.....	.....	1,161
Do. pref	50	61½	.....	62¼	62	63¾	62⅝	63⅜	63	63⅛	62¾	63¼	63	7,700
Penn. Coal	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Penn. RR	50	54⅛	54	54⅝	54⅛	54¾	54⅜	55⅛	54¾	55¼	55⅛	.....	.....	15,128
*Ph. & R. RR	.....	40	39½	40⅝	39	39½	38¾	39½	38⅝	39½	39½	39¼	38¼	244,968
Sunday Creek Coal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do. pref	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tennessee C. & I. Co	.....	86¼	85¾	87¼	86⅛	86⅛	86⅛	86⅛	86	86	85⅝	86	85⅛	11,100
Do. pref	.....	114	113	119	116	119	116	.....	.....	.....	.....	.....	.....	825
Westmoreland Coal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

**Sales in New York, 181,620; in Philadelphia, 63,348. Total sales 414,258.

San Francisco Mining Stock Quotations.

COMPANY	CLOSING QUOTATIONS. Jan. 24.	Jan. 25.	Jan. 27.	Jan. 28.	Jan. 29.	Jan. 30.
Alpha	.....	.....	.....	.....	.....	.....
Alta	1.25	.....	1.25	.....	.....	1.25
Belcher	.....	.....	.....	.....	.....	.....
Belle Isle	.25	.....	.....	.....	.....	.....
Best & Bel	2.50	.....	2.50	.....	2.40	.....
Bodie	.50	.....	.....	.45	.....	.....
Bulwer	.20	.....	.....	.....	.20	.....
Challar	.....	.....	2.35	2.40	2.40	2.80
C'm'weal'h	3.60	3.60	3 70	3.60	3.60	3.60
Con. C. & V	.....	4.65	4.70	4.75	4.65	4.70
Con. Pac.	.....	.....	.....	.....	.....	.....
Crown Pt.	1.50	1.50	1.55	1.55	1.55	1.55
Eureka C.	.....	.....	.....	.....	.....	.....
Gould & C.	.....	.....	1.40	.....	1 40	1.40
Grd. Prize.	.....	.....	.....	.....	.....	.....
Hale & N.	.....	.....	2.90	2.85	3.05	3.00
M. White.	.....	.....	.....	.....	.....	.....
Mexican	2.60	2.55	2.80	2.60	2.80	2.80
Mono	.35	.....	.....	.....	.....	.....
Mt. Diablo	.....	.....	.....	.....	.....	.....
Navajo	.....	.....	.....	.....	.....	.....
Nev. Queen	.....	.....	.....	.....	.....	.....
N. Belle I	.....	.....	.....	1.05	.95	.85
Occidental	.....	.....	.....	.....	.....	.....
Ophir	3.60	3.60	2.35	3 60	3.60	3.70
Potosi	.....	.....	.....	1.75	1.70	1.90
Savage	.....	1.50	1.60	.....	.....	1.65
Sierra Nev	.....	1.90	1.95	1.90	1.90	2.00
Union Con.	.....	2.25	.....	2.30	2.30	2 35
Utah	.65	.70	.....	.65	.65	.....
Yellow Jkt.	1.90	.....	.....	.....	.....	.....

STOCK MARKET QUOTATIONS.

Baltimore, Md.

COMPANY.	Bid.	Asked.
Atlantic Coal	1.00	1.50
Be t. & N. C.	....	....
Big Vein Coal	....	....
Conrad Hill	.05	.07
Cons. Coal	....	....
Diamond Tunnel	.35	.40
George's Crk. C	1.00	....
Lake Chrome	.24	.30
North State (Balt.)	....	....
Ore Knob	.10	....
Silver Valley	.65	....

Prices bid and asked during the week ending. Jan. 30th, 1890.

Birmingham, Ala.

COMPANY.	Bid.	Asked.
Ala. Con. C. & C. Co.	....	$20
Ala. R. Mill Co.	$100	$60
*Alice Furnace.	$104½	....
Anna Howe G. Mg. Co.	$⅝	....
Bir. Mg. & Mfg.	$80	....
Broken Arrow.	....	....
Cahaba Coal Mg Co	$55	$65
Camille Gold Mg. Co.	$⅛	$1
De Bardeleben C. & I. Co.	$70	$80
Decat. L. Imp.	$10½	$10½
DecaturMin.L.	$21	$23
*Eureka	$125@$126	$148@$150
Florence L. & Mg. Co.	$21	$24
Hecla Coal Co.	$30	....
Hen. S. & M.Co	$80	....
Jagger Towley C. & C	$10	$13
Mag-Ellen..	$99	....
Mary Lee C. & R. Co	$36	$45
Sheffield C & I. Co.	$57	$60
Sloss I. & S.	....	$66
†Sloss I. & S.	$97⅜@$97½	$97⅜@$98
††Sloss I. & S.	$75¼	$80
Tuscaloose C. I. & L. Co	$21	....
Tenn.C. & I. Co.	$87	$88
" pref.	$114	$120
Woodstock I.Co.	$57½	$60¼

Prices bid and asked during week ending Jan 28th, 1890.

* Bonds. † First mortgage. †† Second mortgage.

Denver, Colo.

COMPANY.	H.	L.	Sales.
Allegheny, Colo	.32	.27	....
Amity "	.25	.21	....
Aspen United"	.35	.23	....
Big Indian "	.50	.43	....
Big Six "	.22	.14½	....
Brownlow "	.42½	.40	....
Calliope "	.48	.47	....
Claudia, J., "	.17	.13	....
Clay County "	.37½	.35	....
Hard Money "	.15	.11	....
Legal Tender "	.12	.08½	....
Matchless "	1.25	1.00	....
May-Mazeppa"	1.05	.94	....
Mollie Gibson"	....	.50	....
Morning Glim"	.45	.38	....
Pay Rock "	.11½	.10½	....
Puzzler "	.28	.24	....
Silver Cord "	.75	.72½	....
Whale "	.57	.34	....
Total	....	....	....

Prices during the week ending Jan. 21st, 1890.

Kansas City, Mo. Jan. 27.

COMPANY.	Par value.	Bid.	Asked.
Ben Harrison	..	$25.00	$35.00
Burch, L. & Z., Mo.	1	.20	.30
Express Group	....	.75	1.00
Hillsboro Gold	....	....	....
Farmers' Coal Co	....	50.00	75.00
Ida Hill, S., N. Mex	100	....	100
Kansas City L. & Z.	....	.60	....
Kan. City M. & M. Co.	....	2.60	3.00
K. C., Colo.	....	....	....
Kentuck, Z., Mo	1	....	....
La Motte, Mo	100	....	100.00
Leona	....	....	125
Maverick, S., Colo.	10	....	1.00
Minnequa Zinc.	....	.25	.45
Quartz Mt.	....	.67	....
Ruby Silver	....	1.12	1.25
Sonora, G. & S., Mex.	10	....	1.00
Standard, S. S., Colo.	....	....	....
Silver Monument	....	....	3.00
Templar, N. Mex.	1	....	1.00
The Sylph	....	....	2.50
Webb City, L. Z., Mo.	5	5.65	....
Wichita, L. Z., Kan.	100	....	.40

Pittsburg, Pa.

COMPANY.	H.	L.	Closing
Allegheny Gas Co.	$39.75	....	$39.75
Bridgewater Gas Co.	40.00	29.00	40.00
Chartiers Val. Gas	*40.13	*40.00	41.00
Columbia Oil Co.	2.75	....	2.75
Consolidated Gas Co.	38.00	....	38.00
Forest Oil	....	....	....
Hazlewood Oil Co.	....	....	....
La Noria Mining	*.13	*.13	.13
Luster Mg. Co.	*24.50	*24.50	24.50
Manuf'turers Gas Co.	....	....	....
Nat. Gas Co. of W.Va	....	....	....
N.Y.& Clev.Gas Coal.	37.00	36.75	37.00
Ohio Valley Gas.	....	....	....
Pennsylvania Gas	15.00	14.00	15.00
People's N. G. & P. Co.	*14.00	*14.00	14.00
Philadelphia Co.	*31.75	*31 38	31.50
Pine Run Gas Co.	82.50	82.00	82.50
Pittsburg Gas	80.00	66.00	80.00
Silverton Mg. Co.	1.13	1.13	1.13
South Side Gas.	....	....	....
Tuna Oil Co.	70.00	69.00	70.00
Union Gas	....	....	....
Washington Oil Co.	*80.00	*80.00	*80.00
W'house Brake Co.	62.75	..	62.75
W'house A. B. Co.	110.00	110.00	110.00
W'house E. Light.	*48.50	*47.50	48.00
Wheeling Gas	20.00	....	18.50
Yankee Girl Mg.	3.75	3.50	3.50

* Actual selling price.

Sales during the week ending Jan. 30, 1890:

Chartiers Val. Gas.	132 shs.	$40.00@$40.13
La Noria Mg. Co.	250 "	@.13
Luster Mg. Co.	60 "	@$24.50
Peoples'N.G.&P.Co	60 "	@$14.00
Philadelphia Co.	318 "	$31.38@$31.75
W'house A. B Co.	115 "	$47.50@$48.50
Washington Oil Co.	22 "	@$80.00
Wheeling Gas Co.	440 "	$18.63@$18.75

St. Louis. Jan. 29.

CLOSING PRICES.

COMPANY.	Bid.	Asked.
Adams, Colo	$ .28¾	$ .32½
American & Nettie	1.40	1.55
Anderson	....	....
Arizona	....	....
Aztec, N. Mex	....	....
Black Oak, Cal.	....	....
Black Spar	....	....
Bremen	....	.04
Buckskin	....	....
Carriboo, Idaho	....	....
Central Silver	.16¼	.17½
Cleveland, Colo.	....	....
Cleveland, Idaho	.30	.35
Cœur d'Alene	....	....
Dinero, Colo	....	....
Golden Era, Mont	....	....
Golden King	.09	.10
Gold Run	....	....
Granite Mountain, Mont.	47.00	47.50
Hope, Mont	....	....
Ingram	....	....
Iron Clad	....	....
Ivanhoe, Colo	....	....
I. X. L., Colo	....	....
Jumbo, Colo	....	....
Keystone	....	....
La Union	.08	.08½
Little Giant	....	....
Major Budd, Mont	.17½	.20
Mexican Imp., Mex	.16¼	.18¾
Michael Breen	.80	.82½
Montrose Placer, Colo.	.38¾	.42½
Mountain Key	.52½	.57½
Mountain Lion	.06½	.07½
Neath, Colo	....	.05
Old Colony	....	....
Old Jesuit	....	....
Pat Murphy, Colo	.04	.04½
Pedro	.01	.01½
Phillips, Colo	.10	.10½
Pine Grove, Idaho	....	....
Queen of the West, Idaho	.06	.10
Raspberry, Mont	.05	.10
Rosalis	....	....
San Francisco, Mont	....	....
San Pedro	....	....
Silver Age, Colo	1.27½	1.55
Silver Bell	....	....
Small Hopes, Colo	.75	.85
Tourtelotte, Colo	.07½	.09
West Granite, Mont	.80	.81¼
Wire Patch	.10	....
Yuma, Ariz	.37½	.40

Trust Stocks. Jan. 31.

The following closing quotations are reported to-day by C. I. Hudson & Co., members of New York Stock Exchange:

CERTIFICATES.

American Cotton Oil, old.	$33	@$34½
*American Cotton Oil, new	27¾	@ 28
Cattle Trust	12	@ 14
Distillers' & Cattle Feeders'.	39½	@ 40¼
Linseed Oil	43½	@ 44½
National Lead	21¼	@ 21⅝
Natural Gas	125	@130
Standard Oil	164½	@166
Sugar Refineries	64½	@ 64⅝

*These are the American Cotton Oil Central Trust Co.'s receipts and are known as new, and represent the old certificates which have been deposited in the Central Trust Co. in furtherance of the reorganization plan—from a trust to a corporation

Sales at the New York Stock Exchange week ending Jan. 31:

	Sales.	Price H.	Price L.
*American Cotton Oil	13,535	29¼	27½
National Lead	72,513	22⅜	21⅝
Sugar	200,637	65	56⅜

*Trust receipts.

Foreign Quotations.

London. Jan. 18.

COMPANY.	Highest.	Lowest.
Amador, Cal.	£1½	£⅝
Appalachian, N. C.	1s 3d.	9s.
Canadian Phos. Canada.	£⅜	£⅛
Carlisle, N. Mex	3s 6d	3s.
Colorado, Colo.	4s. 6d.	3s. 6d.
Comstock, Utah	....	....
Condova	1s.	6d.
Cons. Esmeralda, Nev.	4s. 3d.	3s. 9d.
Denver Gold, Colo.	1s. 3d.	9d.
Dickens Custer, Idaho.	3s. 6d.	3s.
East Arevalo, Idaho.	2s. 6d.	2s. 6d.
Eberhardt, Nev	....	....
El Caliao, Venezuela	....	....
Elmore, Idaho	4-. 3d.	3s. 9d.
Empire, Mont	9d.	3d.
Garfield, Nev.	5s. 6d.	4s 6d.
Jay Hawk Mont	3s.	2s.
Josephine, Cal	6s.	4s.
Kohinoor, Colo.	2s. 3d.	1s. 9d.
La Luz, Mex.	2s. 3d.	1s. 9d.
La Trinidad, Mex	3s. 6d.	2s. 6d.
La Valera, Mexico	1⅛s.	1⅛s.
Montana Lt., Mont	£1¼	£1⅛
New California, Colo.	10s.	9s.
New Consolidated	1s.	6d.
New Eberhardt, Nev.	1s. 3d.	9d.
New Emma, S., Utah	2s. 9d.	2s. 3d.
New Flagstaff, Utah	2s.	1s. 6d.
Newfoundland, N. F	3s.	2s.
N. Gold Hill, N. C.	1s. 3d.	9d.
New Hoover Hill, N. C.	1s. 9d.	1s. 3d.
Old Lout, Colo.	£15-16	£11-16
Palmarejo, Mex	20s.	19s.
Pinos Altos, Mex	£1 3-16	£1 1-16
Pittsburg Orig., Cal	....	....
Pittsburg Cons. Nev.	3s.	2s.
Plumas Eureka, Cal.	....	....
Quebrada, Venezuela	....	....
Richmond Con. Nev.	2s.	1¾s.
Ruby&Dunderberg,Nev	9d.	3d.
Sam Christan, N. C.	2s. 6d.	3s
Sierra Buttes, Cal.	£7-16	£5-16
Sonora, Mex	1s.	6d.
Stanly, N. C	5s.	4s.
United Mexican, Mex	9s.	7s.
U. S. Placer, Colo.	5s.	4s.
Viola Lt., Idaho	2s. 3d.	1s. 9d.

Paris.* Jan. 16.

Belmez, Spain	550.00	550.00
Caliao, Venez.	79 00	79.00
Caliao Bis, Venez.	4.00	4.00
East Oregon, Ore.	43.00	43 00
Forest Hill Divide, Cal.	....	....
Golden River, Cal	400.00	400.00
" " parts	65.00	65 00
Lexington, Mont.	140.00	140.00
" parts	4.25	4.25
Ouray, Colo	....	....
Rio Tinto, Spain	428.75	428 75
Tharsis, Spain	131 25	131.25

*Francs.

CURRENT PRICES.

These quotations are for wholesale lots in New York.

CHEMICALS AND MINERALS.

Acid—acetic, ℔ 100 lbs. $1.75@$2.00
Muriatic, 18°, ℔ 100 lbs 1.00@1.50
Muriatic, 20°, ℔ 100 lbs 1.12½@1.75
Muriatic, 22° ℔ 100 lbs. 1.37½@2.00
Nitric, 36°, ℔ 100 lbs 4.00@4.25
Nitric, 42°, ℔ 100 lbs 6.00@6.25
Oxalic, ℔ 100 lbs. .6.50@10.50
Sulphuric, 60°, ℔ 100 lbs .80@1.25
Sulphuric, 66°, ℔ 100 lbs. 1.00@1.75

Alkali—
Refined, 48 p. c. 1.50@1.55
Refined, 58°. 1.40@1.45

Alum—Lump, ℔ lb. 1¾
Ground, ℔ lb. 1⅞@2
Lump. ℔ ton, Liverpool £4 17 6
Sulphate of Alumina, ℔ ton £4 10

Aqua Ammonia—48°, ℔ lb. 4¾
30°, ℔ lb. 6
22°, ℔ lb. 6@7
26°, ℔ lb. 10@11

Ammonia—Sul., ℔ 100 lbs. 3.15
Carb., per lb. 7½@8½

Arsenic—White, powdered, ℔ lb. 3½@3¾
Red. ℔ lb 5¾@6¾
White, at Plymouth, ℔ ton. £12 2 6d.

Asbestos—Am., p. ton $50@$300
Italian, p. ton, c. i. f. L'pool £18@£60

Asphaltum—P. ton 13.00
Prime Cuban. ℔ lb. 4½@5½c
Hard Cuban, ℔ ton $28.00
Trinidad, refined, ℔ ton $30.00

Barytes—Sulph., Am. prime white 17@20
Sulph., foreign, floated, p. ton 19½@21.50
Sulph., off color, p. ton 11.50@14.00
Carb., lump, f.o.b. L'pool, ton £6
No. 1, casks, Runcorn " £4 10 0
No 2, bags, Runcorn " " 3 15 0

Bleach—Over 35 p.c., ℔ lb. 1.70@1.75

Borax—Refined, ℔ lb. 9½@9⅝
Concentrated, 7¾@8⅜
Refined at Liverpool, ℔ ton £29

Brimstone—*See Sulphur.*

Bromine—℔ lb. 37@38

Chalk—℔ ton. .75
Precipitated, ℔ lb. 4¾@5

China Clay—English, ℔ ton 13.50@18.50
Southern, ℔ ton 13.50

Chrome Yellow—℔ lb. 10@25

Cobalt—Oxide, ℔ lb. 2.60@2.90

Copper—Sulph. English Wks, ton £20@£21

Copperas—Common, ℔ 100 lbs. 70
Best, ℔ 100 lbs. .75@1.00
Liverpool, ℔ ton, in casks £1 15s.

Cream of Tartar—Am. 99% 22½
Powdered, 99 p. c. 23

Emery—Grain, ℔ lb. 4½@5
Flour, ℔ lb 3¾@3½

Feldspar—Ground, ℔ ton 15.00

Fuller's Earth—Lump, ℔ bbl. .90@.95
Powdered, ℔ lb. 1⅞@2

Gypsum—Calcined, ℔ bbl. 1.25@1.50

Iodine—Resublimed 2.75

Kainit—℔ ton 10.00

Kaolin—*See China Clay.*

Lead—Red, ℔ lb. 6¾@9
White, American, in oil, ℔ lb. 6¾@7¼
White, English, ℔ lb 8½@8¾
Acetate, or sugar of, white 12@13

Lime Acetate—Amer. Brown. .95@1.00
" Gray 1.75@1.87½

Litharge—Powdered, ℔ lb. 6¼@6¾
English flake, ℔ lb. 9@9½

Magnesite—Greek, ℔ ton. 20.00

Manganese—Crude, per unit .23@.28
Oxide, ground, per lb 2½@6½

Mercuric-Chloride — (*Corrosive Sublimate*), ℔ lb. .70@.72

Mineral Wool,—℔ lb. 2

Mica—In sheets according to size, 1st quality, ℔ lb. .25@$6 00

Ochre—Yellow, "B. F.," ℔ ton, f.o.b. mill 30.00
" "J. F. L. S.," ℔ lb. ex dock 2½

Phosphate Rock—S. Carolina, per ton . o. b. Charleston. 5.75@7.00
Ground, ex vessel New York. 11.00
Canadian Apatite, lump, f. o. b. at Montreal, ℔ ton 16.00

Phosphorus—℔ lb. .70@75

Plumbago—Ceylon, ℔ lb. 4@5
American, ℔ lb. 5@7

Potassium—Cyanide, ℔ lb. .39@40
Bromide, ℔ lb. 33
Chlorate, ℔ lb. 13@14
Carb. ℔ lb. 4.70@5.50
Caustic, ℔ lb. 7½@8
Iodide 2.65@2.70
Muriate, ℔ 100 lbs. 1.80
Nitrate, refined, ℔ lb. 6@8
Bichromate, ℔ lb 10½@11
Sulphate, ℔ 100 lbs. 2.30@2.35
Yellow Prussiate, ℔ lb. 17½@18
Red Prussiate, ℔ lb. 42@45

Pumice Stone—Select lumps, lb. 3¼
Original cks., ℔ lb. 1¾@2
Powdered, pure, ℔ lb. 2¼@2½

Pyrites—Non-cupreous, p. units 10d

Quartz—Ground, ℔ ton. 14.00@16.00

Rotten Stone—Powdered, ℔ lb. 3¼@3½
Lump, ℔ lb. 6@10

Salt—Liverpool, ground ℔ sack. 75@80
Turk's Island, ℔ bush .25@2

Salt Cake—℔ lb. 60@62½

Saltpeter—Crude, ℔ lb. 5½@5¾
Refined, ℔ lb. 6@8

Soda Ash—Carb., 48 % 100 lbs. 1.45
Caustic, 48 % 1.30
Soda Caustic, 60% 2.50
" " 70% 2.27½@2.35
" " 74–6% 2.27½@2.35
Sal, English, ℔ 100 lbs. 1.00
Sal, American, ℔ 100 lbs .90
Nitrate, 100 lbs. 1.90@1.95

Strontium—Nitrate ℔ lb. 9@9½

Sulphur—Roll, ℔ lb. 1¾
Flour, ℔ lb 2
Crude Brimstone, 2s., ℔ ton. 19.50
Crude Brimstone, 3ds, ℔ ton. 19 00

Talc—Ground French, ℔ lb. 1¼@1½
Domestic, ℔ ton $18@$20
c. i. f. Liverpool, ℔ ton £4 5

Vermillion—American, ℔ lb. 61
English, ℔ lb. 82@85

Vitriol—(Blue), Ordinary, ℔ lb. 5½@5¾
Extra, ℔ lb. 7

Zinc Oxide—Am., Dry, ℔ lb. 4½
Antwerp, Red Seal, ℔ lb. 6@6½
Paris, Red Seal, ℔ lb. 6½@7
* Spot.

THE RARER METALS.

Aluminum—(Metallic), ℔ lb. $2.@$2.50
Sheet, per lb. 2.50

Arsenic—(Metallic), per lb. .40

Barium—(Metallic), per gram $4.00

Bismuth—(Metallic), per lb. 2.75

Cadmium—(Metallic), per lb. 1.00

Calcium—(Metallic), per gram 10.00

Cerium—(Metallic), per gram 7.50

Chromium—(Metallic), per gram 1.00

Cobalt—(Metallic), per lb. 6.00

Didymium—(Metallic), per gram 9.00

Erbium—(Metallic), per gram 7.50

Gallium—(Metallic), per gram 140.00

Glucinum—(Metallic) per gram. 12.00

Indium—(Metallic), per gram 9.00

Iridium—(Metallic), per oz. 7.00

Lanthanum—(Metallic), per gr. 10.00

Lithium—(Metallic), per gram 10.00

Magnesium—Per lb. 4.50

Manganese—Metallic, per lb. 1.10
Chem. pure, per oz. 10.00

Molybdenum—(Metallic), per gm. .50

Niobium—(Metallic), per gram 5.00

Osmium—(Metallic), per oz 65.00

Palladium—(Metallic), per oz. 35.00

Platinum—(Metallic), per oz. 9.00

Potassium—Metallic, per lb. 28.00

Rhodium—(Metallic), per gram. 5.00

Ruthenium—(Metallic), per gm. 5.50

Rubidium—(Metallic), per gram 2.00

Selenium—(Metallic), per oz. 1.80

Sodium—(Metallic) per lb. 2.50

Strontium (Metallic), per gm. .60

Tantallum—(Metallic) per gram 9.00

Telurium—(Metallic) per lb. 5.00

Thallium—(Metallic) per gram. .25

Titanium—(Metallic) per gram. 2.25

Thorium—(Metallic) per gram. 17.00

Tungsten—(Metallic) per oz. 2.25

Uranium—(Metallic), per lb. 5.00

Vanadium—(Metallic), per gm. 22.00

Yttrium—(Metallic), per gram. 9.00

Zirconium—(Metallic), per oz. 65.00

BUILDING MATERIAL.

Bricks—Pale, ℔ 1,000 3 25@3.50
Jerseys, ℔ 1,000 5.50@6 50
Up Rivers, ℔ 1000 6 00@6.50
Haverstraw seconds, ℔ 1000 6.25@6.50
Haverstraw firsts ℔ 1,000 6.50@7.00
Fronts, nominal, ℔ 1000,
Croton 14.00@16.00
Wilmington 20.00@21.00
Philadelphia @22.00
Trenton @22.00
Baltimore

Building Stone—Amherst freestone, ℔ cu. ft. 95@1.00
Brownstone, ℔ cu. ft. 1.00@1.35
Granite, rough, ℔ cu.ft 45@1.25
Granite, Scotch ℔ cu ft. 1.00@1.15

Cement—Rosendale, ℔ bbl .85@1.10
Portland, American, ℔ bbl. 2 15@2.45
Portland, foreign, ℔ bbl. 2.30@2.40
Portland, " special brands. 2.45@2.75
Roman, ℔ bbl. 2.65@2.85
Keene's coarse, ℔ bbl. 4.50@5.50
Keene's fine, ℔ bbl. 7.00@8.25

Slate—Purple and green roofing, ℔ 100 ft. 7.00@7.50
Red roofing, ℔ 100 sq. ft. 12.00
Black, roofing, ℔ 100 sq. ft. 4.25@5.50

Lime—Rockland, common ℔ bbl. 1.00
Rockland, finishing, ℔ bbl. 1.20
St. John, com. and finish, ℔ bbl. .90@.95
Glens Falls, com. and fin., ℔ bbl. .85@1.10

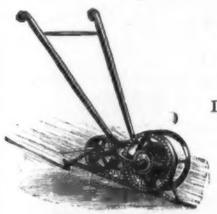
Labor—Ordinary, ℔ day 1.50@2.00
Masons, ℔ day 4.00
Plasterers, ℔ day 4.00
Carpenters, ℔ day 3.50
Plumbers, ℔ day 3.50
Painters, ℔ day 2.50@3.50
Stonesetters, ℔ day 3.50@4.00
Tilelayers, ℔ day 3.50@4.50
Bricklayers, ℔ day 4.00

NEW YORK PRICES CURRENT. FEBRUARY 1, 1890.

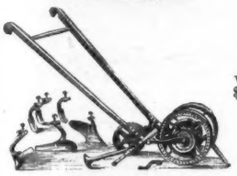
Discounts are for Export Only.

In the interest of the extension of the markets for American manufactures the ENGINEERING AND MINING JOURNAL has secured the services of gentlemen thoroughly acquainted with the export trade and with foreign markets, and it offers its services to foreign buyers who may desire information concerning any article whatever of American manufacture. No charge will be made for these services, either directly or indirectly through commissions on goods purchased. The proprietors of the ENGINEERING AND MINING JOURNAL are neither commission merchants nor exporters, but they have many sources of information, both at home and in foreign countries, and place these at the service of manufacturers and exporters here and of importers and consumers in other countries.

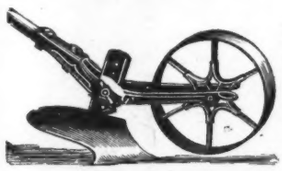
Agricultural Implements.



"Planet, Jr." No. 2 Seed Drill, $9.
Dis. 30%.

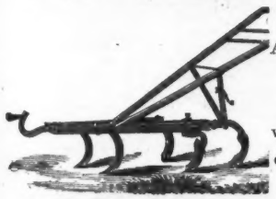


Combined Drill Cultivator Rake, Plow, etc., $12.
Dis. 30%.



"Fire Fly" single-wheel Hoe, Cultivator and Plow, $5.
"Fire Fly" Hand Plow, $2.50.
30 % discount, f.o.b. New York.

All Steel Horse Hoe and Cultivator combined, with wheel, $6 75-100 net.



All Steel Plain Cultivator.
With wheel, $4.50; without wheel. 60c. less.

HAY FORKS.

Gold Finish, Patent Overcaps.
Three Tine Forks.

No.	Tine.	Handles.	Per doz.
30	10 in.	4½ ft.	Boy's $7.75
32	12 "	4 to 6 ft.	..... 9.00
32 S	12 "	"	Strapped.... 10.50
32 B	12 "	"	Bent..... 9.50
32 B S	12 "	"	Bent & St'pd 11.00
33	12 "	"	..... 9.50
33 S	13 "	"	Strapped.... 11.00
33 B	13 "	"	Bent..... 10 00
33 B S	13 "	"	Bent & St'pd 11.50
34	14 "	"	..... 10.25
34 B	14 "	"	Bent..... 10.75
35	15 "	"	..... 11.25
35 B	15 "	"	Bent..... 11.75
42 B	12 "	"	Bent..... 12.50
42 B S	12 "	"	Bent & St'pd 14.00

Manure Forks, Solid Steel Shanks, Gold Bronze Finish, Patent Overcaps.
No. 44, oval, 4 tine, 12 in. tine, 4 ft. handle, plain ferrules, $12.50 per doz.
No. 44 S, oval, 4 tine, 12 in. tine, 4 ft. handle, strapped ferrules, $14.
No. 44½, oval, 4 tine, 12 in. tine, 4½ ft. handle, plain ferrules, $12.50.
No. 44½ S, oval, 4 tine, 12 ft. tine, 4½ ft. handle, strapped ferrules, $14.
No. 54, oval, 5 tine, 13 in. tine, 4 ft. handle, plain ferrules, $19.50.
No. 54 S, oval, 5 tine, 13 in. tine, 4 ft. handle, strapped ferrules, $21.
No. 64, oval, 6 tine, 13 in. tine, 4. ft. handle, plain ferrules, $22.50.
No. 64 S, oval, 6 tine 13 in. tine, 4 ft. handle, strapped ferrules, $24.

HOES.

Ely Standard Socket, all Gold Bronze Neck, full Pol'd, C. S. Blade.

Field, 7	× 5	in., selected handles.. $9.00
" 7½	× 4½	" " " .. 9.00
" 8	× 4¾	" " " .. 9.00
" 8½	× 4½	" " " .. 9.00
" 8	× 5	" " " .. 9.00

Washington County Pattern, spring handles..... 10.00
Rhode Island, 7 to 9 in., spr'g handles 9.00
" " 9½ in. " " 9.25
" " 10 " " " 9.50
Meadow, 9 × 4 in., poplar handles..... 9.00
Meadow, 9½ × 3½ in., poplar handles..... 9.25
Meadow, 10 × 3½ in., poplar handles..... 9.50
Broom Corn, 7½ × 4½ in., poplar handles..... 9.00

Popular Handles in Meadow Socket Hoes, unless otherwise ordered.

PLOWS.

Reversible Oneonta Clipper.

16. Oneonta Clipper, Reversible, Iron beam Cutter..... $14
" Oneonta Clipper, Reversible, Iron Wheel and Cutter..... 15
18. Oneonta Clipper, Reversible, Iron Beam Cutter..... 15
" Oneonta Clipper, Reversible, Iron Beam, Wheel and Cutter..... 16
17. Hard Metal, Reversible, Iron Beam Cutter..... 17
17. Hard Metal, Reversible, Iron Beam, Wheel and Jointer..... 17
19. Hard Metal, Reversible, Wood Beam Cutter..... 16
" " " " " " Wheel and Jointer..... 17
20. Steel Mould Board, Reversible, Wood Beam Cutter 15
" " " " " " Wheel and Cutter..... 16

Iron Beam Plows.
Two-horse Sod and Stony Land.... 8.50 plain.
Curtis's Sod Two horse..... 11.50 "
" " " " ..... 13.00 cutter.
" " " " ..... 14.25 wheel & cutter.

Subsoil Plows.
Two-horse 9.50 Draft Rod.
" " 11.00 Wheel and Draft Rod.

Hitchcock's Potato Digger and Shovel Plow.
Improved adjustable handle shovel plow..... 7.00
Hitchcock's Potato Digger..... 8.00
" " " and shovel plow..... 10.50
Dis. 30%.

RAKES.

The S. R. Nye Improved.
22 Teeth Rake, $32.00
26 " " 34.00
25% dis.
Chieftain Hay Rake Co.

Chieftain Lock Lever
No. 1..... $30.00
No. 2. ..... 30.00
No. 5..... 29.00
Iron wheels, $2 extra.
With Pole, Double Tree and Neck Yoke, $2 extra.
22 cubic feet packed, 400 lbs. gro., 225 lbs. net.

Golden Farmer Self-Dumping Rake, $37.00; 22 cu. ft., 430 lbs. gro., 250 lbs. net.
Chieftain Hay Tedders, $59.00; 700 lbs. gro., 450 lbs. net.
Potato Diggers, $7.00; 100 lbs. gro., 60 lbs. net; dis., 40% f.o.b. ship New York or Boston.

RAKES (GARDEN).

Braced steel garden rakes. Per doz
8 teeth..... $8.00
10 " 9.00
12 " 10.00
14 " 11.00
16 " 12.00

Braced malleable garden rakes.
10 teeth..... $5.50
12 " 6.00
14 " 6.50
16 " 7.00

Ten-Teeth Malleable Garden.	Plain.	Braced.	Steel Garden. Plain.	Braced.
10-Teeth.....	$5.50	$6.00	$9.00	$10.50
12 "	6.00	6.50	10.00	11.50
14 "	6.50	7.00	11.00	12.50
16 "	7.00	7.50	12.00	13.50

Dis. 70 and 5%.

Cast steel garden rakes.
Per doz.
10 teeth, polished, tapering bar, tempered rake. $9.00
12 " " " " " " 10.00
14 " " " " " " 11.00
16 " " " " " " 12.00

Cast steel lawn rakes.
12 teeth, polished, tapering bar, tempered rake..... $10.00
14 teeth polished tapering bar, tempered rake..... 11.00
16 teeth polished tapering bar, tempered rake..... 12.00
18 teeth polished tapering bar, tempered rake..... 13.00
Dis. 70% from Standard Association list.
Prices made where XX handles, etc., are required.

SCYTHES (GRASS).

Waldron's pattern, oiled..... $8.50
Silver steel, painted..... 8.50
Western dutchman, bronzed and painted..... 9.00
Clipper, polished web..... 9.00
Fine cutlery steel, full polished..... 10.00
All steel, full polished..... 11.00

Grain Scythes.
Waldron's pattern, oiled..... 11.25
Silver steel, painted..... 11.25
Clover, oiled..... 11.25
Clipper, bronzed and painted..... 11.50

Lawn Scythes.
Clipper, bronzed and painted..... 9.00
Dis., 40 and 10%.

SOWER, BROADCAST SEED.

Goodell & Co.
Per dozen..... $36 f.o.b
Gross wt., 110 pounds per dozen
Net wt., 75 pounds per dozen.

Anvils.

"Eagle anvils.

	Weight about			Weight about	
No. 000.....	½ lb.	$1 00	No. 4.....	40 lbs.	$4.25
" 00.....	4 "	1.70	" 5.....	50 "	5.05
" 0.....	10 "	2.20	" 6.....	60 "	5.50
" 1.....	15 "	2.75	" 7.....	70 "	6.00
" 2.....	20 "	3.00	" 8.....	80 "	7.00
" 3.....	30 "	3.75	" 9.....	90 "	8.00

Anvils weighing 100 to 800 lbs., 10 cts. per lb. Discount 20 and 10 %.

Arms and Ammunition.

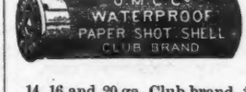
Wood Powder.
American Wood Powder Company.

	Kegs, 25 lbs.	¼ kegs. 6¼ lbs.	1 lb. cans,
Trap for first quality arms only.....	$19.50	5.00	.85
A, for large bore.....	17.00	4.35	.75
C, for general use..			
D, fine for small bore and rifles.....			
E, very fine for small bore rifles and gallery shooting.....			

		Discount. Per cent.
Bullet Breech Caps.....	per lb. 1.60	10
Conical Bullet Caps.....	" 1.75	10

	Discount. Per cent.	
Rim Fire Cartridges.....	60	10
Military Rim Fire Cartridges.....	15	10
Central Fire Pistol and Rifle Cartridges..	40	10
Central Fire Metallic Cartridges for Target and Sporting Rifles.....	30	10
Military Cartridges, Central Fire.....	30	10
Lefaucheux Cartridges.....		60

		Special
Gatling Cartridges.....		
Primed Shells and Bullets.....	25	10
Friction Cannon Primers.....	20	10
Primers.....		10
Percussion Caps, F. G ..... per M.	33c.	
U. M. C..... "	42½c.	
Musket..... "	45c.	
Brass Shot Shells, U. M. C., 1st qual.....	60	10
Club brand.....	65	10



Paper Shot Shells.
14, 16 and 20 ga. First quality, 30, 10 and 10 per cent; 4, 8, 10 and 12 ga., First quality, 25, 10 and 10 per cent.
14, 16 and 20 ga. Club brand, 30, 10 and 10 per cent, 10 and 12 ga. Club brand, 33⅓, 10 and 10 per cent.
Gun Wads, 20 and 5 per cent.

RIFLES.

Colts' Lightning Magazine.

			Discount 10 per cent
40/60 and 45/60 calibre octagon barrel...	10	lbs.	$15.38
" " " " round " ...	9¾	"	14.25
" " " " carbine " ...	9	"	14.25
32, 38, and 44 calibres, octagon " ...	7¼	"	13.50
" " " " round " ...	6¾	"	12.38
" " " " carbine " ...	6¼	"	12.38
" " " " baby carbine.....	5¼	"	12.38
22 calibre, rim fire, octagon barrel.....			15.38
" " round.....			14.25

Remington Light (Baby) carbines, 44 cal., nick.. $7.50.

MARLIN RIFLE. MODEL, 1889.

The best in the market, embodying all latest improvements.

38 and 44 calibres, using the same cartridges as Winchester rifles of the respective sizes.

Octagon barrel,	24	inch,	6½	lbs..... $19.50
" "	26	"	6¾	" 21.50
" "	28	"	7	" 23.50
Round "	24	"	6½	" 18.50
Carbine	20	"	5½	" 17.50

Discount, 25, 10 and 10%.

REVOLVERS.

Smith & Weston

32, Single Action, 3, 3¼ in., $8.00.
32, Double Action, 3, 3¼ in., $9.35.
32, Safety Hammerless, 3, 3½ in., $11.00.

38, Single Action, 3¼ in., $9.40; 38, Single Action, 4 in., $9.65; 38, Single Action, 5 in., $10.00; 38, Double Action, 3¼ in., $10.40; 38, Double Action, 4 in., $10.65; 38, Double Action, 5 in., $11.00; 38, Safety Hammerless, 3¼ in., $12.00; 38, Safety Hammerless, 4 in., $12.25; 38, Safety Hammerless, 5 in., $12.50; 44, Single Action, 4 in., $11.50; 44, Single Action, 5 in., $11.75; 44, Single Action, 6, 6½ in., $12.00; 44, Double Action, 4 in., $12.50; 44, Double Action, 5 in., $12.75; 44, Double Action, 6½ in., $13.00; 44, Double Action Favorite, 5 in., $12.75.

Colts.

Discount, 10 per cent from following prices.

Double Action Army, 44 and 45 calibre, 4¾, 5½, 7½ inch bbl., $13.00.
Double Action, 41 calibre, 2½ to 6 inch bbl., $11.20.
" " 38 " 2½ to 6 " " $10.00.
Single " Army, 45 calibre, 4¾, 5½, and 7½ inch bbl., $12.00.
Single Action Army, 44 calibre, "Frontier," 4¾, 5½, and 7½ inch bbl., $12.00.
New Line, 41 calibre, blued or nickeled, $4.00.
" " 32 " " " 4.00.
" " 30 " " " 2.00.
" " 22 " half or full plate, 2.10.
Old Model, 22 calibre, by the hundred, half or full plate, $1.50.
Colt Deringer. 41 calibre, per pair half or full plate, $5.50.

American Bull Dog

Double Action 32, 38 and 44 calibre, 2½ inch barrel, $1.60; Double Action 32, 38 and 44 calibre, 4½ inch barrel, $1.85; Double Action 32, 38 and 44 calibre, 6 inch barrel, $2.10.

F. & W. British Bull Dog revolvers, 32 and 38 calibre 2½ inch bbl., $1.80.
F. & W. Automatic revolver, 32 and 38 calibre, 3¼ inch bbl., $5.50.
H. & R. Automatic revolver, 32 and 38 calibre, 3¼ inch bbl., $4.75.
Defender revolvers, Single Action, 22, wood handle, 65.
" " " " 22, rubber " 70.
" " " " 32, wood " 85.
" " " " 32, rubber " 90.

Remington Army revolver, Single Action, 44 cal., frontier cartridge, 5¾ inch barrel, $6.50.
Remington Army revolver, Single Action, 44 cal., frontier cartridge, 7½ inch barrel, $6.00.
Remington Double Deringers, 41 cal., rim fire, $4.05.
National Deringers, 41 calibre, per pair, half or full plate, $4.00.

New House, 41 or 38 calibre, blued or nickeled, $5.00.
" Police, 38 calibre, 6 in., " " 7.00.
" " 38 " 4½ in., " " 7.00.

MARLIN AUTOMATIC DOUBLE ACTION REVOLVERS.

32 and 38 cal., 3¼ bbl., $10; 25 and 10%.

This revolver is made in the best manner, and is equal toany in the market. Uses Smith & Wesson cartridges.

H. & R. AUTOMATIC DOUBLE ACTION REVOLVERS.

32 and 38 cal., 3¼-in. barrel, 4.75 net.

H. & R. EJECTING DOUBLE ACTION REVOLVERS.

32 and 38 cal., 3¼-in. barrel, 4.00 net.

AMERICAN DOUBLE-ACTION REVOLVERS.

32, 38 and 44 cal., $1.75, net, 2½ in. bl.
32, 38 and 44 cal., $2, net, 4½ in. bl.
32, 38 and 44 cal. $2.30, net, 6 in. bl.

AMERICAN BULLDOG REVOLVERS.

32, 38, 44 cal., 2½ in. bl., $1.60, net.

Assay Furnace.

Hydro-Carbon Blow-Pipe Assay Furnace.

No. 2, Muffle Furnace taking C Battersea Muffle 8x4¼x3 in..... $10.00
No. 3, taking F Muffle, 10x6x4 in..... 15.00
No. 1. Crucible Furnace, taking Battersea, U or Colorado B Crucible, 4 in. dia. 5½ deep.. 4.00
No. 2, taking Battersea E, round, 5 in. dia., 6½ deep..... 5.00
Blow-Pipe No. 1, with half gallon tank, made of plain, strong sheet metal..... 18.00
Blow-Pipe No. 2, with half gallon tank, made entirely of seamless brass..... 23.00
Blow-Pipe No. 3, with one gallon tank, otherwise same as No. 2..... 26.00
Blow-Pipe No. 1, Muffle Furnace No. 2, and Crucible Furnace No. 1..... 32.00
Blow-Pipe No. 2, Muffle Furnace No. 2, and Crucible Furnace No. 1..... 37.00

Axes, etc.

Shingling Hatchets.

	1.	2.	3.
Collins',	$4.75,	$5.25,	$5.75 doz., dis 10%.
Peck's,	$8.00,	$8.50,	$9.00 doz. dis. 45%.
Ryder's,	$8.00,	$8.50.	$9.00 doz., dis. 50%.

Claw Hatchets.

	1.	2.	3.
Collins',	$5.25,	$5.75.	$6.25 doz., dis. 10%.
Peck's,	$9.00,	$9.50	$10.00, doz 45%.
Ryder's,	$9.00,	$9.50,	$10.00 doz., dis. 10%

Hatchets, Broad Single Bevel.

Collins', cut in., 5, $9.50; 5½, $10.00; 6, $10.50; 6½, $11.00; 7½, $11.50; dis. 10%.

Peck's, cut in., 4, $10.50; 4½, $11.50; 5, $13.00; 5½, $14.50; 6, $16.50; 6½, $18.00; 7½, $19.50; 8¼, $22.00; dis. 45%.

Ryder's, cut in., 5, $13.00; 5½, $14.50; 6, $16.50; 6½, $18.00; 7½, $19.50; dis. 50%.

Adzes.

	House. Half flat head. Dozen.	Ship spur poll. Dozen.	Discount. Per cent.
Collins'...	$14.00	$13.00	10
Peck's....	24.00	25.00	45
Ryder's...	24.00	25.00	50

Broad Axes—Pittsburgh Pattern.

5 to 8 pounds, $32.00 dozen.
7 to 9 pounds, $35.00 dozen.
8 to 10 pounds, $38.00 dozen.
9 to 12 pounds, $45.00 dozen.
Western pattern same price.

Spanish Pattern. Detumba round eye, $10.50 per doz.

Spanish Pattern Media labor, $12.25 per dozen.

Axle Grease.

Frazer's (2-lb. tins), per gross..... $18.00
2-lb. wooden boxes, " 12.00
Discount, 25 and 5 %.
Dixon's Everlasting, boxes 1 lb., per doz..... $1.20
" " " 2 lbs., " 2.00

Lovell, Tracy & Co.

English coach axle grease.

Regular wooden boxes per gross, $8.50.

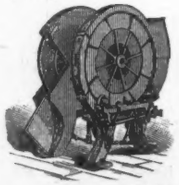
Axleine.

Decorated tin boxes, per gross $12.

Special prices on quantity, and goods in large packages.

See Oils, page 10.

Barrel Machinery.



Stave Jointers.

Single Wheel	Beer Keg Stave Jointer,	16 to 22	in.	8	8	$190
Double "	" " "	16 " 22	"	8	8	330
Single Wheel	Half Barrel "	"	24 " 30	"	8	8	275
Double "	" " "	"	24 " 30	"	8	8	440
Single "	Barrel "	"	30 " 36	"	8	8	330
Double "	" " "	"	30 " 36	"	8	8	500

Double Independent Barrel Stave Jointer with Wheels, on separate shafts, but suspended in one frame, 30 to 36 in 8 8 520
Single Wheel Barrel Stave Jointer, 32 to 38 in. 8 8 350
Double " " " " 32 to 38 " 8 8 550
Double Independent Barrel Stave Jointer, 32 to 38 in..... 8 8 575

Bellows.

Miner's Bellows: 24 in., $8.50; 26 in., $9.75; 28 in., $11.00; 30 in., $11.25; 32 in., $13.50. 60 and 5% dis.

Standard, each: 18 to 24 in., $10; 28 in., $12; 32 in., $14; 34 in. $16; 36 in., $18; 38 in., $20; 40 in., $23; 44 in., $32. 60 and 5% dis.

Hand Bellows, per doz.: 6 in., plain, $10; fancy, $20; 7 in., plain, $12; fancy, $24; 8 in., plain, $14; fancy, $28; 9 in., plain, $16; fancy, $32; 10 in., plain, $18; fancy, $36. 50% dis.

Belting.

LEATHER BELTS.
Standard Manufacturers List.
Single belts per foot.

Width.		Width.		Width.	
1 inch	.10	6 inch	.76	20 inch	2.84
1¼ "	.13	7 "	.90	21 "	3.02
1½ "	.17	8 "	1.02	22 "	3.20
1¾ "	.20	9 "	1.15	23 "	3.37
2 "	.23	10 "	1.29	24 "	3.54
2¼ "	.26	11 "	1.42	26 "	3.92
2½ "	.30	12 "	1.55	28 "	4.30
2¾ "	.33	13 "	1.68	30 "	4.64
3 "	.36	14 "	1.82	32 "	5.00
3½ "	.43	15 "	1.98	34 "	5.35
4 "	.50	16 "	2.14	36 "	5.70
4½ "	.56	17 "	2.31	40 "	6.40
5 "	.63	18 "	2.49	44 "	7.10
5½ "	.70	19 "	2.66	48 "	7.80

Double belts twice the price of single.
Discounts of Newark Leather Belting Co.
Dis. single and double belts, cemented, 50 and 5%.
Dis. single and double belts, riveted and cemented, 50 and 5%.
Dis. single belts, cemented and lacesewn, water proofed, 50%.
Dis. double belts, cemented and lacesewn, water proofed, 45%.

See Rubber Belting, page 7.
See Link Belting, page 9.

Bolts.

Philadelphia Tire Bolt, with forged nuts.
Price per hundred. Condensed list.

Length	1-8	3-16	7-32	1-4	5-16	3-8
1	$1.50	$1.50	$1.50	.....	.....	.....
2	1.50	1.60	1.85	$2.25	$3.05	$5.00
3	.....	1.90	2.25	2.75	3.65	5.80
4	.....	.....	.....	3.25	4.25	6.60
5	.....	.....	.....	.....	4.90	7.40

Fractional sizes, intermediate prices.
Discount 80 and 2 %.

Common Carriage Bolts, price per hundred.

Length.	3-16 & 1-4	5-16	3-8	7-16	1-2	9-16 & 5-8	3-4
1 to 1½	$1.35	$1.60	$2.30	$3.10	$3.80	$7.50	
2	1.45	1.75	2.30	3.10	3.80	7.50	
3	1.65	2.05	2.70	3.60	4.44	7.50	$13.50
4	1.85	2.35	3.10	4.10	5.08	8.50	14.90
5	2.05	2.65	3.50	4.60	5.72	9.50	16.30
6	2.25	2.95	3.90	5.10	6.36	10.50	17.70
7	2.45	3.25	4.30	5.60	7.00	11.50	19.10
8	2.65	3.55	4.70	6.10	7.64	12.50	20.50
9	2.85	3.85	5.10	6.60	8.28	13.50	21.90
10	3.05	4.15	5.50	7.10	8.92	14.50	23.30
12	3.45	4.75	6.30	8.10	10.20	16.50	26.10
14	3.85	5.35	7.10	9.10	11.48	18.50	28.90
16	4.25	5.95	7.90	10.10	12.76	20.50	31.70

Fractional sizes, intermediate prices. Dis. 75 and 10%.

Philadelphia Carriage Bolt, price per hundred.

Length	1-8, 3-16 & 1-4	5-16	3-8	7-16	1-2
1 inch.	$3.00	$4.00	$5.00	$7.40	$9.00
2 "	3.40	4.10	5.00	7.40	9.00
3 "	3.80	4.70	5.80	8.20	10.00
4 "	4.20	5.30	6.60	9.00	11.00
5 "	4.80	6.00	7.40	9.80	12.00
6 "	5.40	6.60	8.20	10.60	13.00
7 "	.....	7.30	9.00	11.40	14.00
8 "	.....	7.90	9.80	12.20	15.00
9 "	.....	8.50	10.60	13.00	16.00
10 "	.....	.....	11.40	13.80	17.00
11 "	.....	.....	.....	14.60	18.00

Fractional sizes, intermediate prices. Dis. 80 and 5 %.

Brick Machinery.

WELLINGTON MACHINE CO.

Heavy Steam Power Machine	$525.00
Horse-Power Machines	300.00
Additional Horizontal Pugmill	225.00
Brick Moulds	$2.50 to $3.00
Brick Trucks	5.00 to 13.50
Brick Barrows	7.25
Brick Barrows with Springs	8.2
Sand Barrows, steel tray	6.5(

Burglar Alarm.

Tommins & Adams.

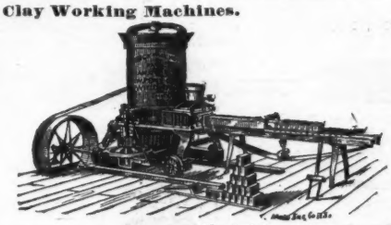
SAFETY AUTOMATIC BURGLAR ALARM AND DOOR FASTENER.

REQUIRES NO WINDING UP.

Per doz., $24. Dis., 40%.

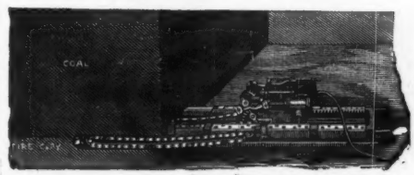
The slightest push on the door explodes two caps in succession and rings alarm bell.

Clay Working Machines.



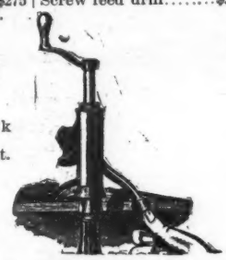
	No. brick per day.	Compl'te.
No. 10 D brick machine	50,000	$1,500
No. 10 S " "	30,000	1,200
No. 4 " "	40,000	1,100
No. 7 S " "	20,000	650
No. 6 S " "	15,000	575
No. 2 E. H. P. "	6,000	3,360

Coal Mining Machine.



Jeffrey.
6 feet undercut.....$1500 | 5 feet undercut.....$1400
Jeffrey Power Coal Drills.
Air feed drill.....$275 | Screw feed drill.....$200
Discount, 10%.

Cork Pullers.



The Samson Cork Puller, per dozen, $12 net.

Crucibles.

E. H. Sargent & Co.
Battersea Crucibles, Triangular.

No.	Height. Inches.	Width. Inches.	Crucibles. Per doz.	Covers. Per doz.
S	4½	4⅛	$1.00	$0.50
T	4	3¾	0.80	0.50
U	3½	3¼	0.60	0.40
V	3¼	2⅞	0.45	0.40
W	2⅞	2⅝	0.35	0.30
X	2½	2¼	0.30	0.30
Y	2⅛	2⅛	0.25	0.30
Z	1¾	1¾	0.20	0.30

Battersea Muffles, any size, made to order.
See Illustration in advertisement.

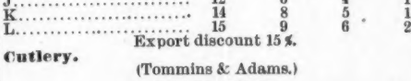
No.	Long. Inches.	Wide. Inches.	High. Inches.	Price. Each.
A	7	3½	2½	$ .60
B	7½	4⅛	2⅞	.75
C	8	4¾	3	.85
D	8½	5	3¼	1.00
E	9	5½	3⅝	1.15
F	10	6	4	1.25
G	11	4	3½	1.00
H	10½	5¼	3⅞	1.00
J	12	6	4	1.25
K	14	8	5	1.75
L	15	9	6	2.00

Export discount 15 %.

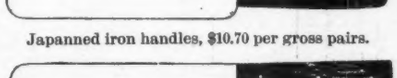
Cutlery.

(Tommins & Adams.)

KNIVES—TABLE.

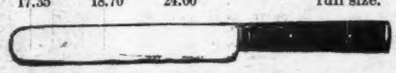


Japanned iron handles, $10.70 per gross pairs.



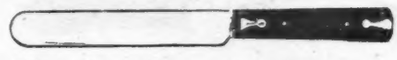
Cocobola handles.	Ebony handles.	Bone handles.	
10.70	12.00	15.35	gross pairs.

14.70	16.00	18.70	"	"	medium size.
17.35	18.70	24.00	"	"	full size.

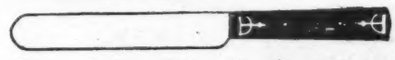


17.35	18.70	21.35	"	"	medium.
20.00	21.35	26.70	"	"	full size.

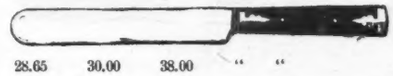
22.70	24.00	29.35	" "



27.35	28.70	36.00	
Cocobola handles.	Ebony handles.	Bone handles.	gross pairs.



28.00	29.35	38.00	"	"

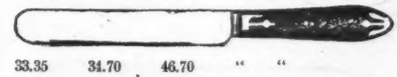


28.65	30.00	38.00	"	"

28.65	30.00	38.00	"	"

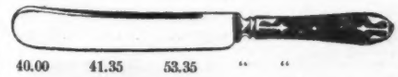
32.00	33.35	38.00	"

34.70	36.00	48.00	"	"

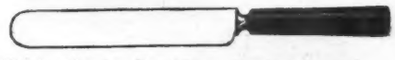


33.35	34.70	46.70	"	"

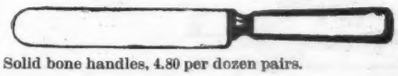
37.35	38.70	50.70	"	"



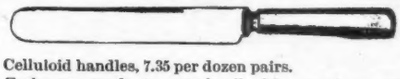
40.00	41.35	53.35	"	"



Hard rubber handles, 5.75 per dozen pairs.



Solid bone handles, 4.80 per dozen pairs.

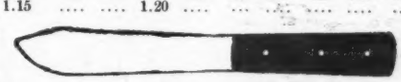


Celluloid handles, 7.35 per dozen pairs.

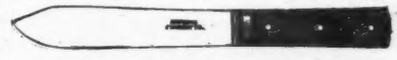
Forks are made to match all above patterns, with either three or four prongs.
Discount 25 %.

BUTCHERS'—COCOBOLA HANDLES.

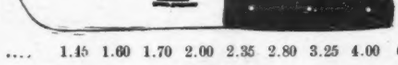
	Per dozen.								
4 and 4½ in.	5 in.	5½ in.	6 in.	6½ in.	7 in.	8 in.	9 in.	10 in.	12 in
1.15	....	....	1.20	....	....	....	....	....	....



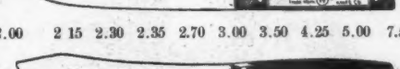
1.40	....	....	1.50	....	..	....	....	....	....



1.15	1 20	1.30	1.40	1.70	1.90	2.35	3.00	3.70	5.35



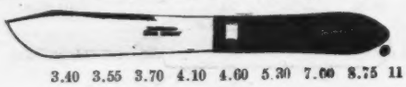
....	1.45	1.60	1.70	2.00	2.35	2.80	3.25	4.00	6.0



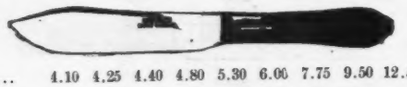
2.00	2 15	2.30	2.35	2.70	3.00	3.50	4.25	5.00	7.50

2.45	2.70	2.95	3.15	3.45	3.70	4.35	5.00	6.00	8

2.10 2.20 2.35 2.50 2.80 3.40 4.35 5.30 6.85 ...



3.40 3.55 3.70 4.10 4.60 5.30 7.00 8.75 11



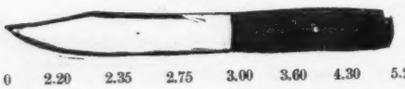
.... 4.10 4.25 4.40 4.80 5.30 6.00 7.75 9.50 12.5

2.00 2.15 2.30 2.35 2.70 3.00 3.50 ....

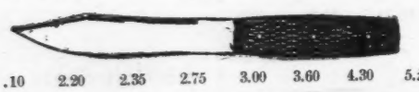
Discount 25 and 10 %.

HUNTING—EBONY HANDLES.

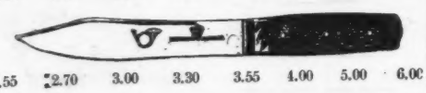
n 4½ in. 6 in. 6½ in. 7 in. 8 in. 9 in. 10 in.
Per Dozen.



0 2.20 2.35 2.75 3.00 3.60 4.30 5.25



.10 2.20 2.35 2.75 3.00 3.60 4.30 5.25



2.55 2.70 3.00 3.30 3.55 4.00 5.00 6.00

.55 2.70 3.00 3.30 3.55 4.00 5.00 6.00

Discount, 25 and 10 %.

Per Dozen.
Putty knives, cocobola handles..... ..... $1.30@$1.50

SHEARS.
TAILORS'—JAPANNED OR NICKEL HANDLES.

Per pair.

12 in.....	6.00
12½ in.....	7.00
13 in.....	8.00
13½ in.....	9.00
14 in.....	10.00
14½ in.....	11.00
in ..... 12.00 | 16 in.....	14.00

Discount, japanned, 60 %; nickle, 45 %.

BENT TRIMMERS.

Per dozen.

6 in.....	13.00	10 n.....	27.00
7 in.....	15.00	11 in.....	30.00
8 in.....	17.00	12 in.....	33.00
9 in	22.00		

STRAIGHT TRIMMERS.

Per dozen.

6 in.....	12.00	10 in.....	25.00
7 in.....	14.00	11 in.....	30.00
8 in.....	16.00	12 in.....	33.00
9 in.....	19.00		

LADIES' SCISSORS.

Per dozen.

4½ in.....	10.00	6 in.	11.00
5 in.....	10.00	6½ in.....	12.00
5½ in.....	10.50	7 in.....	13.00

PAPER AND BANKERS'.

Per dozen.

9 in...	18.00	13 in....	36.00
10 in...	23.00	14 in....	42.00
11 in...	27.00	16 in....	54.00
12 in.	32.00	18 in ...	20.00

BARBERS'.

Per dozen.

7½ in.....	15.00	9 in.....	18.00
8 in.....	16.00	9½ in.....	20.00
8½ in	17.00		

SCISSORS.

BUTTON-HOLE.

5 and 5½in., 14.00 per dozen.

Discount, japanned, 70 and 10 % nickel, 60 and 10 %

PRUNING.

1 B., 9 in., 24 per dozen; 2 B., 8½ in., 21; 3 B., 7¾ in., 19.80.

No. 110, 10 in., $30 per doz.

PRUNING SHEARS FOR LONG HANDLES.
No. 1, $36 per dozen; No. 2, $30 per dozen.
Discount, 35%.

SPOONS, FORKS, ETC., BEST PLATE ON HARD WHITE METAL.

Tipped Tea Spoon.

Oval Tea Spoon.

Perfect Tea Spoon.

Leader Tea Spoon.

	5 oz. or extra plate: Tipd	Oval.	Perfect and Leader.
Tea spoons.	4.25	4.50	4.75 per doz.
Dessert spoons.	7.50	8.00	8.50 " "
Table spoons.	8.50	9.00	9.50 " "
Coffee spoons.	4.25	4.50	4.75 " "
Dessert forks.	7.50	8.00	8.50 " "
Medium forks.	8.50	9.00	9.50 " "

Discount, 60 and 5%.

Spoons and forks, German silver, tipped pattern.

Tea spoons.	Table spoons.	Medium forks.
22.50	45.00	45.00 per gross.

Discount, 60 %.

Spoons and forks, made from brass, and silver plated on a coating of hard, white nickel.
Aesthetic medium fork.

Tea spoons.	Table spoons.	Medium forks.
7.50	15.00	15.00 per gross.

Discount, 30 and 5 %.

Children's sets *on cards*.

	3 pcs.	4 pcs.	
Leader pattern, as per cut....	21.00	24.00 doz.	60 and 5 %
Aesthetic pattern, as per cut..	5.75	7.25 doz.	30 and 5 %

Cutters.

FEED.

No. of cutter.	No. of knives.	Length in inches of knives.	Length in inches of feed cut.	Price.
1	2	6¼	⅛, ¾ and 1⅛	$18.00
2	2	7¼	⅛, ¾ and 1⅛	21.00
2½	1	7¼	⅝, ⅞, 1¼ and 1¾	21.00
2½	2	7¼	⅛, ⅛, ⅝ and ⅞	23.00
3	1	8½	⅝, ⅞, 1¼ and 1¾	25.00
3	2	8½	⅛, ⅛, ⅝ and ⅞	27.00
4	1	10	⅝, ⅞, 1¼ and 1¾	30.00
4	2	10	⅛, ⅛, ⅝ and ⅞	33.00
5	2	10	⅛, ⅝, ⅞ and 1¼	35.00
6	2	11	⅛, ¾, 1¼ and 2	45.00
6½	2	11	⅛, ¾, 1¼ and 2	45.00
7	2	13	⅛, ¾, 1¼ and 2	60.00
7½	2	13	⅛, ¾, 1¼ and 2	60.00
10	2	16	⅛, ¾, 1¼ and 2	80.00
12	2	20	⅛, ¾, 1¼ and 2	100.00
11	2	11	⅛, ¾, 1¼ and 2	45.00
13	2	13	⅛, ¾, 1¼ and 2	60.00
16	2	16	⅛, ¾, 1¼ and 2	80.00
20	2	20	⅛, ¾, 1¼ and 2	100.00

The knife arbors for all sizes are made of machinery steel. 30 per cent. dis

VEGETABLE—GALE'S.

Size.	Weight of Fly Wheel. Pounds.	Will cut per hour. Pounds.	Price
No. 1½	20	1,500	$12
No. 2½	32	1,700	15
No. 3½	32	1,700	15
No. 4	42	2,000	18
No. 5	50	3,000	25
No. 10	65	8,000	35

30% dis.

Drill—Portable Hand Rock.

Price, $225.

Dis., 20%.

Duck and Twine.

22-inch, Hard, Medium and Soft.

	Weight per yd.	Cents, per yd.		Weight per yd.	Cents, per yd.
No. 0...	19 oz.	35	No. 6...	13 oz.	26
1...	18 "	33	7...	12 "	25
2...	17 "	32	8...	11 "	23
3...	16 "	30	9...	10 "	21
4...	15 "	28	10...	9 "	20
5...	14 "	27			

Ravens, 28½-inch.—Eight ounce, 15 cents per yard Ten ounce, 19 cents per yard; twelve ounce, 22 cents per yard; Fifteen ounce, 27 cents per yard. Dis. 25 and 1%.

Cotton Sail Twine.—Three-fold and upward, 17 to 20 cents per pound. Dis. 3%.

Electroplate.—Babcock & Co.'s.

Dis. 60 and 2%.

CASTERS.

1,200—Dinner.

232—Breakfast.

Dinner Casters.

No. 1,200. 17½ in. high, $8.00, quadruple plate.
No. 80. 17 in., $6.00, quadruple plate.
No. 140. 16 in., $7.50, " "
No. 830. 16 in., $5.00, " " Plain, 50 cents less.
No. 25. 16 in., $4.00, double plate.
No. 33. 16 in., $3.75, " "
No. 53. 15 in., $3.00, " "
No. 15½. 14½ in., $2.00, single plate.
No. 19. 14½ in., $1.85, " "
No. 40. 14 in., $1.75, " "

No. 681.

Breakfast Casters.
231. 10 in. high, $4.00, quadruple plate.
No. 232. 12 in. high, $6.00 quadruple plate.
No. 13. 12 in. high, $2.25, double plate.
No. 12. 10½ in. high, $1.75, single plate.

CAKE BASKETS.
Quadruple Plate.
No. 448. 7 in. high-chased, $16; gold lined, $17.
No. 690. 7½ in. high, chased, $7; gold lined, $8.
No. 686. 6½ in. high-chased, $4.50; gold lined, $5.50.
No. 681. 6 in. high, chased, $3; gold lined, $3.50.

BUTTER DISHES.

No. 126. 11 inches high, $5.50.
No. 127. 7 inches high, $5.50.
No. 75. 8 inches high, $1.85.
No. 78. 7½ inches high, $2.00.

Discount.

CHILD'S SETS.

No. 90.

No. 90. Satin lined case, cup, saucer, knife, fork and spoon, $2.25.

No. 41. Cup, gold lined, in fancy case, $1.15.

No. 43. Cup and saucer, gold lined, fanc case, $1.15.

FLAT WARE.

Calla Lily, Empress, Windsor and Olive Patterns, 18 Per Cent Nickel Silver Base.

	Extra plate, per doz.	Double plate, per doz.	Triple plate, per doz.
Tea spoons	$4.75	$6.00	$7.25
Dessert spoons	8.50	10.50	12.50
Table spoons	9.50	12.50	14.50
French coffee spoons	4.75	6.00	7.25
Berry or nut spoons	24.00	30.00	36.00
Bar spoons, small	4.75	6.00	7.25
Dessert forks	8.50	10.50	12.50
Medium forks	9.50	12.00	14.50
Oyster forks	7.00	9.00	11.00
Sugar shells	9.00	11.00	13.00
Sugar tongs	25.50	31.50	37.50
Butter knives, twist or reversed handles	10.50	12.50	14.50
Nut picks	4.75	6.00	7.25
Pie knives, engraved blades	42.00	51.00	60.00
Soup ladles	48.00	60.00	72.00

PICKLE DISHES.

No. 144. 12 in. high, $3.50
No. 66. 10½ in. high, $2; assorted colored glass.
No. 155. 12 in. high, $4; assorted colored glass.
No. 146. 12½ in. high, $9; hand decorated glass.
No. 156. 12½ in. high, $6; hand decorated glass.

No. 146.

No. 255.

TEA SETS.

No. 255. 6 pieces, $35, quadruple plate.
No. 301. 4 pieces, $23, quadruple plate.
No. 1847. 6 pieces, $42, quadruple plate.

Explosives.

Ætna Powder Company.

Dynamite, 75% Nitro-Glyceine, per lb	.32
" 60% " " "	.25
" 40% " " "	.20
Blasting powder A, per keg 25 lbs	$2.40
" " B, " " "	1.90
Sporting powder, standard brands, per keg 25 lbs	5.00
" " " " " 12½ lbs.	2.75
" " " " " 6¼ lbs.	1.50
" " high grades " 6¼ lbs.	3.00
" " " " per can 1 lb	.60
" " fancy brands " 1 lb	1.00

Discounts special for quantity.

Safety fuse, cotton, 12 M ft. in case	$2.85 per M ft.
" " single tape, 6 M ft. in case	4.25 " "
" " double tape " "	5.40 " "
" " triple tape " "	6.50 " "

Discount 17½%.

Detonating caps, triple force, 25 M. in case	$5.00 per M.
" " quintuple force, 25 M. in case	7.50 per M.
Electrical exploders, 4 ft. wires	$3.00 per 100
" " 6 "	3.54 "
" " 8 "	4.08 "
" " 10 "	4.62 "

Discount 15%. Long lengths to order.

	No.	Capacity.	
Magneto Blasting Machines	1 V.	8 holes	$17.00
" " "	2 V.	20 "	25.00
" " "	3 L.	20 "	25.00
" " "	3 V.	30 "	30.00
" " "	4 V.	60 "	50.00

Discount 15%.

Blasting cables	$5.00 each, discount 40%.
" reels	5.00 " " 20%.

Flouring Mill Machinery.

Nordyke & Marmon Co.

Roller Mills for Wheat Flour.
Prices of Double and Single Roller Mills.

Size.	All smooth.	½ Corrug. ½ smooth.	All corrug.	Single machines. Corrug.	Smooth.
6×12	$465	$475	$480	.....	.....
6×16	515	525	530	.....	.....
6×20	565	575	580	.....	.....
7×14	515	525	530	.....	.....
7×18	560	570	575	.....	.....
7×24	635	645	650	.....	.....
9×18	625	640	650	$350	$335
9×24	700	720	735	390	375
9×30	785	810	830	440	420

20-inch New Era Mill for Wheat, Corn, and Middlings.

Size. Inch.	Power. H. P.	Pulley. Inch.	Capacity Bush.
20	4 to 10	14×7	12 to 40

Speed.	Weight. Lbs.	Price.
500 to 800	660	$150

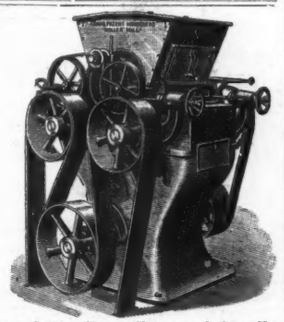
Farm and Plantations Mills.

Diameter of burrs.	Power to drive.	Size of pulley.	Capacity per hour.	Revolutions per minute.	Weight.	Price.
	H. P.					
14 in.	2 to 4	9×5½	4 to 14 bushels	600 to 1200	370 lbs.	
18 in.	4 to 10	11×6½	8 to 40 bushels	400 to 700	600 lbs.	

The Dixey Mill—Stiff Spindle Style.

Size..	Power.	Capacity.	Weight. Pulley.	Geared	Pulley.	Iron gear.	Mortise gear.
18	4 to 6H.P.	8 to 25 bu	560 lbs	650	$130	$165	
22	6 to 8 "	12 to 30 "	800 "	1000	165	200	
26	8 to 12 "	16 to 40 "	1100 "	1500	185	220	
30	10 to 15 "	25 to 60 "	1300 "	1700	215	255	

Flour Mills.
E. P. Allis & Co.

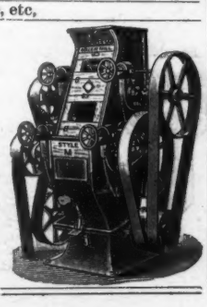


Gray's pat. noiseless belt roller-mills, porcelain rolls.

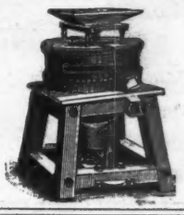
		With corrugated chilled iron rolls.				With Wegmann's patent porcelain rolls.				Divided four roller machines.			
Price		$600.00	800.00	580.00		$600.00				$650.00			
Approximate shipping weight.	lbs.	2,700	"	"		2,700	lbs.			2,700	lbs.		
Length of driving belt above floor.		16' 3"	19' 3"	16' 6"		16' 6"	2,700	lbs.		16' 6"	2,700	lbs.	
Approximate power required.		1¾ to 2½ H. P.	3 " 4 H. P.	2½ " 3½ H. P.		1½ to 2½ H. P.				1½ to 2½ H. P.			
Revolutions per minute.		200 to 300	200 " 300	200 " 300	300 " 400					300 to 400			
Driving pulley.		20" × 6¼"	20" × 6¼"	20" × 5¼"	12" × 5¼"					12" × 5¼"			
Width.		5"	4"	10"	3"	10"				10"			
Length.		3" 2"	5" 6"	10" 3"	10'	3'	10"			3'	10"		
Height.		5' 7"	5' 10"	5' 1½"	5'	1½"	3'	10"		5'	1½"	3'	10"
Size of Rolls.		14" × 16" single	14" × 16" double	9" × 14"	9" × 14"					9" × 14"			
										1-pr. cor.	1-pr. sm.		
										9" × 14"			
										1-pr. sm.	1-pr. por.		
										9" × 14"			
										1-pr. cor.	1-pr. por.		

For grinding corn, feed, rye, etc,

Size.	Height.	Width.	Length.
6" × 12"	4' 6"	3' 5"	2' 7"
9" × 14"	5' 8"	3' 10"	3' 5"
9" × 18"	5' 8"	4' 9"	3' 5'
9" × 24"	5' 8'	5' 6"	3'



The Nordyke Bradford Portable Mill.



Size of stones, In.	Grinding capacity. Corn, bu. per hour.	Wheat bu. per hour.	Horse-power.	Weights. Sing'l gear.	Double gear.	Pulley mill.	Geared mills. Iron wh'ls.	Mortise wh'ls.
18	8 to 10	.....	4	550	625	$130	$165	$180
20	10 to 12	.....	5	600	700	140	175	190
22	12 to 15	.....	5	700	850	160	190	210
24	15 to 18	.....	6	900	1050	175	210	225
26	18 to 20	8 to 10	8	1200	1400	185	225	250
30	20 to 25	10 to 12	10	1500	1700	225	285	290
36	25 to 30	14 to 17	12	1800	2100	315	355	380
42	35 to 40	19 to 21	15	2000	2300	390	435	460

Driving pulley.	Revolutions per minute.	Length of belt above floor.	Approximate shipping weight	Price.
10" × 5¼"	400 to 500	14'	.....	$500.00
14" × 6¼"	350 to 450	18'	2600 lb.	600.00
14" × 7¼"	350 to 450	18'	3050 lb.	650.00
14" × 8¼"	350 to 450	18'	3350 lb.	735.00

Flue Cleaner.
Hurley's Automatic Steam Flue Cleaner.

No.	Outside diam. of tubes.	With hose clamps.	Globe Valves.	Best 4-ply steam hose. Per foot.
1	1½ to 2	$5.00	½, 95 cents	¾, 67 cents.
2	2 to 2½	6.25	½, 95 cents	¾, 67 cents.
3	2½ to 3	7.50	¾, $1.30	¾, 67 cents.
4	3 to 3½	8.75	1, 1.75	1¼, 83 cents.
5	3½ to 4½	10.00	1¼ 2.90	1¼, $1.04

Dis. on flue cleaners, 60 and 70%.
Dis. on steam hose, 50%, good to 90 lbs steam.

Forges (Portable).

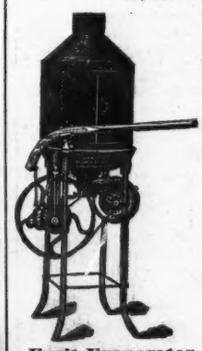
Fairbanks.

No. 2c, weight, 155 lbs.	21 × 27	hearth		$42.00
" 3a, " 80 "	18 in.	diam.	hearth	27.00
" 3b, " 75 "	18 "	"	"	24.00
" 3c, " 85 "	18 "	"	"	30.00
" 6a, " 45 "	14 "	"	"	18.00
" 6B, " 45 "	14 "	"	"	16.00

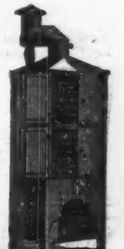
Dis. 60%.

No. 1, 18 in. bellows, $20; No. 2, 20 in. bellows, 25; No. 3, 22 in. bellows, $30.
20% dis.
Stationary.
27 in. bellows, $21; 30 in. bellows, $25; 33 in. bellows, $33; 36 in. bellows, $45.
20% dis.

Riveting Forges.
Bellows, 18 in., $8.00. 20 in., $10.00. 22 in., $13.00. 24 in., $17.00.
20 % dis.



Light work, 12 × 17; height, 15 in., $16.00.
Same, with Hood, 12 × 17; height, 28 in., $20.00.
Bridge, Boiler or Railroad work, Pan, 17 × 19; height, 29 in.; Fan, 8 in., $27.00.
Same, with Hood, $30.00.
Water Tank, $4.00 extra.
Iron Fire Ring Round Tuyere, $1.00 extra.
50 % dis.



Fruit Evaporator.

No. 1. Evaporator	$30
No. 2. Fruit Drier and Baker, with Bleacher attachment. Weight, 225 lbs. Capacity, 5 to 7 bushels apples per day; 24 in. deep, 26 in. wide, 5½ ft. high; 12 trays, 22 22; 40 square feet drying surface.	Complete $50
No. 3. Capacity, 15 to 20 bushels per day	100
No. 4. Capacity, 20 to 30 bushels per day	160

Dis., No. 1, 3 and 4 = 20%. No. 2 = 30%.
Boxing, extra:
No. 1, $3.00; No. 2, $5.00; No. 3, $7.50; No. 4, $12.50.
Freight to New York:
No. 1, $4.00; No. 2, $6.00; No. 3, $12.00; No. 4, $18.00.

Gaskets.

Corrugated Copper.

Price, 2 cents per square inch, less 30 per cent. discount for home trade.

Less 60% discount for export trade.

Glass Tube Cutters.

One Arm Carries Rotary Cutter Price, $2.50 each.

Glassware.

6-in. bowl and cover, per doz.....$3.25
7-in. " " " 4.50
8-in. " " " 6.00
9-in. " " " 8.00
10-in. " " " 10.50

Net.

Nappy, 4½-inch., per doz., 50c.; 6-inch., per doz., $2 inch., per doz., $3; 8-inch., per doz' $4.

Cream Pitcher, 1 pint, per doz., $1.25; one quart, per doz., $3.50; 3 pints, per doz., $4.50.

Pint Pitcher, per doz., $1.50; quart pitcher, per doz., $2; ½ gallon pitcher, per doz., $3; 3 quart pitcher per oz., $4.50.

Flange Butter and Cover, per doz., $1.75.
Water Set, per doz., sets of 60 pieces. $7.50.

Cheese Dish and Cover, 8 in., per doz., $4.50.
Quart Water Bottle, per doz., $4.50.

Ind. Salts; per gross, $2.00. A sorted patterns.
4 Bottle Castors, per doz., $7.50; 3 bottle, per doz., $4.50.

Berry Dish, 4½-inch , per doz., 50c.; 10-inch, per doz., $4.
Butter Dish and Cover, per doz., $1.25.
Butter Dish and Cover, per doz., 75c.

Candlesticks, per doz., $2.00. Glass Slipper for Flowers, per doz., 50 cents; slipper and tray, per doz., $1. Jam Jar and Cover, 1 qt., per doz., $2.50; ½ gal., per doz., $3.25; ¾ gal., per doz., $4; 1 gal., per doz., $5; 1½ gals., $9; 2 gals., per doz., $12. Pocket Flask, 1 pint, $1.

Tumblers. 1½ oz., per doz., 50 cents.
8 " " 75

9 oz., per doz., $2.75.

11 oz., assorted patterns, per doz., 30 cts.

9½ oz., assorted patterns, per doz., 25 cts.

1 oz. to 12 oz., nested for shipping, per doz. nest, $2.

Goblets, banded, per doz 65 cents.
Claret to match, per doz., 55 cents.
Wines, to match, per doz., 50 cents.
Cordials, to match, per 45 cents.

Goblets, per doz., 50 cts.
Claret, " 50 "
Wine " 35 "

Banded, open, hollow stem.

Champagne, per doz., $1.25.

½ Pt. tumbler, per doz..55 cts.
½ Pt. mug to match, " ..65 "
Goblet, " " ..50 "
Spoon holder, cream pitcher, sugar, butter dish to match.
Sets of 4 pieces, per doz. sets, 48 pieces, $3.75.

Grinding Mills.—Emmert & Lamb.

"Daisy," without Shaking Bolt, 170 pounds, 9 cubic feet, $40.
"Daisy," with Shaking Bolt, 185 pounds, 9 cubic feet, $48.
} Discount 25 per cent.

"The Union Mill."

Diameter of Buhr Stones	Size of Pulleys	
	Diam.	Face.
12 in.	8 in.	6¼ in.
16 "	9 "	7½ "

Horse Power	Capacity in B'sh's	Speed	Without Bolt	With Bolt	Sacking Elevator, Extra	Extra Metal Buhrs
8 to 10	12 to 30	1200 to 1500	$90.00	$105.00	$15.00	$1.20 pair
10 to 15	20 to 50	1000 to 1600	160.00	178.00	17.50	1.50 "

Hammers.

Adz-eye Hammers.—Per Dozen.

No.	Weight.		No.	Weight.	
5.	Round.	1 lb., 4 oz $9.00	7½.	Round.	13 oz .. $8.00
7.	"	1 lb..... 8.50	8	"	7 oz.... 7.50

Adz-eye Hammers.—Per Dozen.

No. 17. Octagon. weight, 1 lb., 4 oz.....$9.00

Adz-eye Hammers.—Patent Nail Holder.—Per Dozen.

No.	Weight.		No.	Weight.	
33.	Bell-face.	1 lb., 4 oz. $9.50	35.	Round h.	1 lb., 4 oz $9.50
34.	"	1 lb. 9.00	36.	"	1 lb..... 9.00

Adz-eye Hammers.—Bell Face.—Per Dozen.

No.	Weight.		No.	Weight.	
37.	1 lb., 4 oz	$9.00	38½.	13 oz	$8.00
38.	1 lb	8.50	39½.	7 oz	7.50

Farriers' Hammers.—Per Dozen.

No.		Weight.	
55.	Adz-eye. Octagon.	9 oz.	$7.75
56.	" "	7 oz.	7.50
57.	Plain. "	7 oz.	6 25
58.	Plain Brad.	4 oz.	5 50
60.	Adz-eye, Round Head.	7 oz.	7 50
61.	" Octagon. Boston pattern	10 oz.	8.00
62.	" " "	7 oz.	7 50

Machinists' Ball Pein Hammers.—Octagon.—Per Dozen.

No.	Weight.		No.	Weight.	
90.	3 lbs	$22.00	94.	1 lb., 4 oz	$13 50
90½.	3 lbs., 8 oz	19.00	95.	1 lb	12.50
91.	4 lbs., 4 oz	17.50	96.	12 oz	12.00
92.	2 lbs	16.50	97.	8 oz	12.00
92½.	1 lb., 12 oz	15.50	98.	6 oz	12.00
93.	1 lb., 8 oz	14 50			

Discount, 35 and 5 per cent. Net Cash, 30 days. 10 per cent. Cash, 10 days. Cases at Cost.

Hand Carts

No. 0 42 wheel, 1 in. tread, 1 in. axle box 48x28x10 deep, $10.50.
No. 1, 36 wheel, 1 in. tread, ⅝ in. axle, box 40x23x10 deep, $9.00.
No. 2, 30 wheel, ¾ in tread, ¾ in. axle, box 32x20x9 deep, $8.25.
With Wagon-Seat Spring.
No. 6, same sizes as No 0.....$12.00
" 7, same sizes as No. 1..... 10.50
" 8, " " " No. 2..... 9.75

With Third Wheel, Without Springs.

No. 3, same sizes as No. 0.....$12.00
" 4, " " No. 1..... 10.50
" 5, " " " No. 2..... 9.5

Hardware Specialties.

AUGERS.

Patent Adjustable Hollow.

Cuts from ¼ to 1¼, pivoted jaws, graduated scale to 1-16ths, per doz., $60.00

Discount, 15 and 10%.

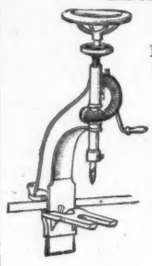
Patent Hollow Auger.

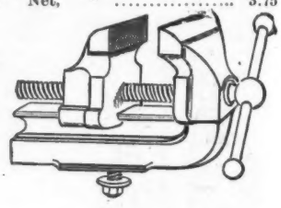
Inch.....	5-16	⅜	7-16	½
With bits....	12.00	12.00	12.00	12.00
Without bits	8.00	8.00	8.00	8.00
9-16	⅝	¾	⅞	1
14.00	14.00	14.00	16.00	16.00	20.00
9.00	9.00	9.00	13.00	13.00	14.00
1¼	1⅜	1½			
20.00	24.00	24.00			
14.00	16.00	15.00			

Discount, 15 and 10%.

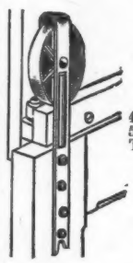
BENCH DRILL.

Adjustable bed plate.
26½ high drills to ½ in. hole, 3½ run of screw.
List price, each.....$10.00
Net, " 3.75



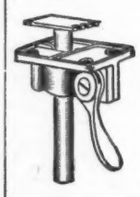


Bench Vise, Steel Jaws, 3½ in., opens 3 in.; weight, 12 lbs.: list price. each. $4.00.: net price. each. $1.60.



BARN DOOR HANGER.

4 in., per doz. pairs.....$12.00
5 " " " 14.40
Track, per foot..... .08
One dozen pairs in case.
Dis., 50%.

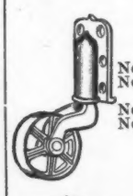


BENCH HOOK.
Patent, adjustable and reversible
List $9 dozen, ½ dozen in box.
Discount, 20 and 10%.

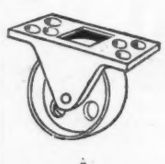
BLACKSMITH'S TONGS.

Swivel Jaw.

No. 1, 16 in., per doz.....$10.00
" 2, 18 " " 10.00
Dis. 20%.



CASTERS.
Swivel Store Truck
No. 20, japanned, 4 in. wheel, each..... .55
No. 25, " 5 " " ..... .75
Noiseless turned wheel.
No. 30, japanned, 4 in. wheel, each..... 1.30
No. 35, " 5 " " 1.60
Discount, 25%.



Store Truck, stationary.
No. 50, 5-inch wheel, 1½ inch wide, each, $1.05.
No. 60, 5-inch, extra heavy, 1½ inch wide, each $1.50.
Discount, 25%.

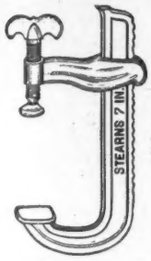
CLOTHES REEL.

Extra heavy, gray iron, japanned.
List per doz.....$15.00
Net " 7.00

JACK SCREWS.
New pattern wrought iron screw.

No.	Rise of screw.	High.	Diameter screw.	Price.
20	4½ in.	10 in.	2 in.	$4.50
25	6½ "	12 "	2 "	5.25
30	8½ "	14 "	2 "	5.75
7	11½ "	16 "	2 "	6.50

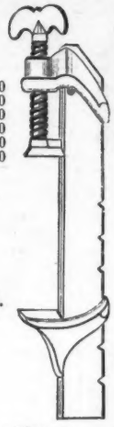
Discount, 40%.



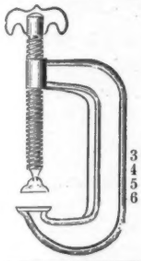
SCREW CLAMPS.
Adjustable.

3 in.,	per doz.	$4.00
5 "	"	6.50
7 "	"	9.00
9 "	"	10.50
12 "	"	15.00
16 "	"	20.00

⅛ doz. in box.
Discount, 20 and 10%.



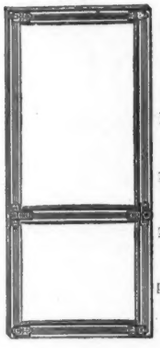
CLAMPS.
New Door Frame.
3 ft. long, per doz., $8 list; $5 per doz. net.



Malleable Iron Screw Clamps.

Per Doz.		Per Doz.	
3 in.	$7.00	7 in.	$20.00
4 "	10.00	8 "	25.00
5 "	12.00	9 "	27.50
6 "	16.00	10 "	30.00

3, 4, 5, 6 in., ⅛ doz. in box.
Dis., 70%.



DOOR SCREEN FRAMES.
Patent Corners.

No. 22, 3 by 7 ft. sticks, ⅞ by 2, per doz. sets, $11.

No. 24, 3½ by 8 ft. sticks, ⅞ by 2, per doz. sets, $12.

No. 26, 3 by 7 ft. sticks, ⅞ by 2½, per doz. sets, $12.50.

No. 28, 3½ by 8 ft. sticks, ⅞ by 2½, per doz. sets, $14.50.

Dis., 20%.

WINDOW SCREEN FRAMES.
Patent Japanned Corners.
No. 25, 36 by 36 corners and screws, without bead, per doz., $2.50.
No. 25, 36 by 36 corners and screws, with bead, per doz., $2.90.
No. 35, 42 by 42 corners and screws, without bead, per doz., $2.90.
No. 35, 42 by 42 corners and screws, with bead, per doz., $3.30.
Black satin stain, sticks ⅞ by 1 in.
Dis., 20 %.

PULLEYS.
Side, No. 45, Japanned.

Inches...	1	1½	2	2½	3	4	5
Per doz..	.90	1.00	1.60	2.40	3.50	9.00	15.00

2 inch and under, 2 dozen in box: 2½, 3 and 4, 1 dozen in box; 5 inch, ½ dozen in box.
Discount, 50%.

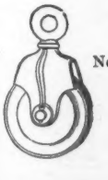
PULLEY HOOK (New Floor.)
Deep cut thread, forged point.

	Per doz.
¾ in. wrought iron, 8 in. long, list	$1.90
net	1.00

WELL WHEEL.
New pattern.
Japanned.

In.	8	10	12	14	16
Pr.d.	7.00	9.50	12.50	20.00	30.00

Discount, 70%.



HAY FORK PULLEY.
New pattern.

No. 15, 5 in. iron wheel	per doz.	$4.50
25, 5 in. wood	"	4.50
66, 6 in. "	"	6.00

4 dozen in case, 8 dozen in barrel.

No. 15, per dozen, $2 net.

SHEAVES.
Patent Common
Turned and polished iron wheels, round corners, brass pin, one set in box.

2½ inch	$1.50
3 "	1.60
4 "	2.00
5 "	2.60

Discount, 50%.

SINKS.
All 6 inch deep.

14 × 20 in.	$1.50	18 × 30 in.	$2.50
15 × 25 in.	1.75	18 × 32 in.	3.00
15 × 27 in.	2.00	18 × 36 in.	3.00
16 × 24 in.	1.80	20 × 30 in.	3.00
16 × 28 in.	2.10	20 × 36 in.	3.70
17 × 30 in.	2.25	20 × 40 in.	4.00
18 × 24 in.	2.10		

Discount, 60%.

SPOKE POINTERS.

Per doz.
No. 1, points 1⅞ in. diameter, $9.00
No. 2, points 2⅝ in. diameter, $15.00

Discount, 15 and 10%.

½ dozen in box.

VISE.
(Bench Vise, Steel Jaws.)
3½ in. opens 5 in., weight 12 lbs.
List price, each..$4.00
Net " " .. 1.60

Silent Saw Vise.
No. 10., 10 in. jaw, per doz.... $15.00
Dis., 33⅓%.

No.		per dz.	gr., lbs.
1	Amateur vise	$2.25	70
Anvil.			
2		3.75	200
3		11.25	615
4		18.00	1,350
10		24.00	1,675

No.	Clamp.	per dz.	gr., lbs.
	1½	3.00	80
	2½	5.00	220
	3½	14.25	700
	4½	21.00	1,425
	Combination hand	5.25	85

Spot cash discount, 33, 20 and 2, f.o.b.
Nos. 1, 1½, 2 and 2½ are packed in dozens; Nos. 3 and 3½ in half dozens; Nos. 4, 4½ and 10 in quarter dozens, and No. 20 singly. Each hand vise is put up in neat box and packed in half dozen lots.

1 Hinge pipe vise, 0 to 2 in. pipe	Each $10.00
2 " " " 0 to 4 in. pipe	20.00
1 Malleable pipe vise, 0 to 2 in. pipe	8.00
1 Combination pipe and bench vise, 0 to 2 in. pipe	16.00

Discount, 50%.

WRENCHES.
Coes' Knife Handle Wrenches.

BLACK.

Size.	₱ doz.	Size.	₱ doz.
6 inch	$9.00	15 inch	$24.00
8 "	10.00	18 "	30.00
10 "	12.00	21 "	36.00
12 "	14.00		

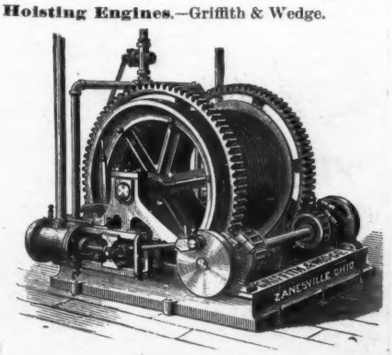
BRIGHT.

4 inch	$10.00	12 inch	$16.00
6 "	10.00	15 "	26.00
8 "	11.00	18 "	32.00
10 "	14.00	21 "	38.00

Discount, 55, 10, 7½ and 3 %.

Coes Mechanics' Screw Wrenches, same list, less 55, 10, 10, 7½ and 3 %.
A. G. Coes & Co. Pat. Screw Wrenches, same list as above. Discount, 55, 10, 7½ and 3%.

Hoisting Engines.—Griffith & Wedge.

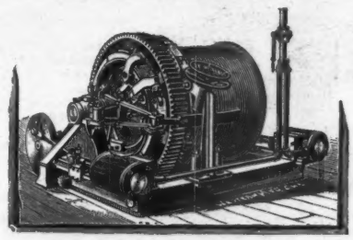


	Weight.	$
Hoisting Engines, Miner's Prospecting	4,500	750
Hoisting Engines, No. 1 Double Cylinder	4,500	800

Discount, 20%.

"	"	No. 2 Double Cylinder	6,000	1,000
"	"	No. 3 " "	11,000	1,550
"	"	No. 4 " "	15,500	1,800
"	"	No. 5 " "	17,000	2,100
"	"	No. 6 " "	13,600	1,750
"	"	No. 7 " "	17,000	2,100
"	"	No. 8 " "	19,000	2,400
"	"	No. 9 " "	48,000	4,500

Discount, 25%.



Webster Camp & Lane Machine Co.

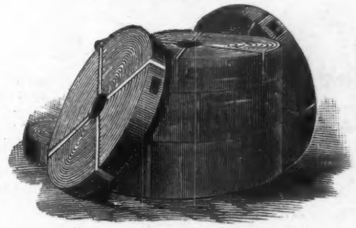
Single drum. No.	Average Load. Pounds.	Double drum. Approx. weight, complete. Pounds.
$825.00 = 5	1,950	6,000 = ...
918.50 = 6	1,650	6,500 = ...
1,177.00 = 7	2,200	8,000 = $1,661.00
1,331.00 = 8	3,000	8,500 = 1,815.00
1,694.00 = 9	3,500	14,000 = 2,722 50
1,914.00 = 16½	3,700	16,000 = 3,124 00
2,343.00 = 17½	5,500	19,000 = 3,333.00
2,475.00 = 18	5,500	22,000 = 3,872.00

Ice Machines (Family).

L. DERMINGNY & Co.
No. 1, Ice machine, ice and ice cream molds, 1 lb. ice, $15.00.
No. 2, Ice machine, ice and ice cream molds, 1½ lbs. ice, $20.00.
No. 3, Ice machine, ice and ice cream molds, 1 carafe 1 bottle holder, 2 lbs. ice, $26.50.
No. 4, Ice machine, ice and ice cream molds, 2 carafe 1 bottle holder, 4 lbs. ice, $33.00.
No. 5, Ice machine, ice and ice cream molds, 3 carafe 1 bottle holder, 6 lbs. ice, $40.00.
No. 6, Ice machine, ice and ice cream molds, 4 carafe 1 bottle holder, 9 lbs. ice, $46.50.

India Rubber Goods.

MECHANICAL.
Commonwealth Rubber Co.



RUBBER BELTING.

Inches.	2 ply per foot.	3 ply per foot.	4 ply per foot.	5 ply per foot.	6 ply per foot.
1	$0.07	.....	.....	.....	.....
1¼	0.09	.....	.....	.....	.....
1½	0.11	.....	.....	.....	.....
2	0.15	$0.17	$0.21	.....	.....
2½	0.18	0.22	0.26	.....	.....
3	0.22	0.26	0.31	.....	.....
3½	0.26	0.30	0.37	.....	.....
4	0.30	0.34	0.42	.....	.....
4½	0.33	0.39	0.47	.....	.....
5	0.36	0.43	0.52	.....	.....
6	0.43	0.52	0.62	.....	.....
7	0.51	0.60	0.73	.....	.....
8	0.59	0.70	0.84	$1.05	$1.25
9	0.67	0.80	0.95	1.18	1.42
10	0.75	0.90	1.07	1.33	1.60
11	0.83	1.00	1.18	1.47	1.77
12	0.91	1.08	1.30	1.62	1.95
13	1.00	1.18	1.42	1.77	2.13
14	1.08	1.28	1.54	1.92	2.31
15	1.16	1.38	1.66	2.07	2.49
16	1.25	1.50	1.78	2.22	2.67
18	1.41	1.70	2.02	2.52	3.03
20	1.58	1.90	2.26	2.82	3.39
22	1.76	2.12	2.52	3.15	3.74
24	1.96	2.36	2.80	3.50	4.20
26	2.18	2.60	3.08	3.85	4.62
28	2.42	2.84	3.36	4.20	5.04
30	.....	.....	3.64	4.55	5.46
32	.....	.....	3.92	4.90	5.88
34	.....	.....	4.20	5.25	6.30
36	.....	.....	4.48	5.60	6.72
38	.....	.....	4.76	5.95	7.14
40	.....	.....	5.04	6.30	7.56
42	.....	.....	5.32	6.65	7.98
44	.....	.....	5.60	7.00	8.40
46	.....	.....	5.88	7.35	8.82
48	.....	.....	6.16	7.70	9.24
50	.....	.....	6.44	8.05	9.66
52	.....	.....	6.72	8.40	10.08

Dis. Reliance, 60 and 5. Dis. Royal, 60, 10 and 10. Dis Manhattan, 70 and 5. See Leather Belting, page 3; Link Belting, page 9.

PACKING.

Piston Packing.

Round Piston Packing
Per lb. 85c.
Discount, 60, 10 and 5 per cent.

Square Piston Packing.

Price same as above. Round and square piston packing is made in lengths of twelve or twenty-four feet.

Square Piston Packing.
Rubber back, per pound $1. Discount 60 per cent. Best only.
Square piston packing rubber back is made in lengths of twenty feet.

PURE VALVE GUM
PURE
PURE VAL
C1 PACKIN
C1 PACKING
C1 PACKING
C1 PACKING

PAPER LAMPS.
Lined with oil proof composition.

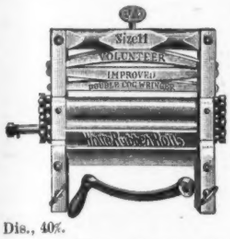
	No. 0.	No. 1.	No. 2.
Height,	2⅛ in.	3 in.	3¾ in.
Diameter,	3½ in.	2½ in.	2⅛ in.
Weight, ⅌ doz.,	3¾ lbs.	1¾ lbs.	2 lbs.
Price, $2.75 per doz.	$2.25		$2.75

	No. 0.	No. 3.	No. 4.
Height,	2⅛ in.	5 in.	6½ in.
Diameter,	3½ in.	3½ in.	4 in.
Weight, ⅌ doz.,	3¾ lbs.	3½ lbs.	7 lbs.
Price, $2.75 per doz.	$3.25		$1.50

Dis., 20%.

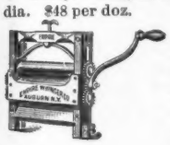
Miners'.
Brass, Collar and Breast in one piece, Spout and Body in one piece.
Price, $9 per gross net.

Laundry Appliances.



Rolls.
"Volunteer." Length 10 in. x 1¾ in. dia. $40 per doz.
"Volunteer." Length 11 in. x 1¾ in. dia. $50 per doz.
"Volunteer." Length 12 in. x 1¾ in. dia. $50 per doz.
Dis., 40%.

"Daisy." Length, 10 in. x 1¾ in. dia. $30 per doz.
"Daisy." Length, 12 in. x 1¾ in. dia. $48 per doz.
Dis., 40%.

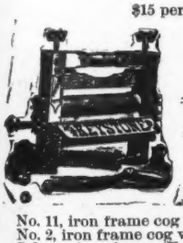


"Empire." Length, 10 in. x 1¾ in. dia. $63 per doz.
"Empire." Length, 11 in. x 1¾ in. dia. $74 per doz.
"Empire." Length, 12 in. x 1⅞ in. dia. $84 per doz.
"Empire." Length, 12 in. x 1⅞ in. dia. $87 per doz.
"Empire." Length, 14 in. x 2¼ in. dia. $156 per doz.
"Empire." Length, 14 in. x 2¼ with pulleys. $220 per doz.
"Empire." Length, 16 in. x 2½ with pulleys. $360 per doz.
Dis., 40%.

EMPIRE CLOTHES DRYING BARS.
$10 per doz.
Dis., 40%.

Closed. Open for use.

EMPIRE FOLDING WASH BENCHES



$15 per doz. Dis., 40%.
Royal Keystone cog wheel, 10 by 1¾ rolls, $36 per doz.
No. 10, wood frame cog wheel, 10 by 1¾ rolls, $24.50.
No. 16, wood frame cog wheel, 11 by 1¾ rolls, $29.
No. 18, wood frame cog wheel, 11 by 1⅞ rolls, $33.50.
No. 20, wood frame cog wheel, 11 by 2 rolls, $39.50.
No. 22, wood frame cog wheel, 12 by 1⅞ rolls $39.50.
No. 24, wood frame cog wheel, 12 by 2 rolls, $48.50.
No. 11, iron frame cog wheel, 10 by 1¾ rolls, $20.
No. 2, iron frame cog wheel, 10 by 1¾ rolls, $24.
Solance iron frame (Eureka Pat.), 10 by 1¾ rolls, $20.
Solance iron frame (Eureka Pat.), 11 by 1¾ rolls, $24.50
F.o.b. cars at works; 60 cents doz entra f.o.b. New York.
Keystone Double Bench Wringer.
Rolls, 10 by 1¾, $36.50 per doz. Made to fold.
Folding Double Folding Wash Bench, packed 6 in crate per doz., $14.

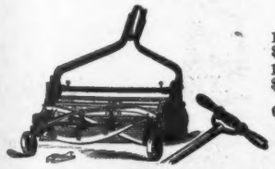
Adams Ironing Table, per doz.	$15.00
Keystone Washing Machines, per doz.	24.00
Complete " " "	13.50
People's " " "	13.50
Lovell " " "	13.50

Lawn Mowers.

Forward Cut Mowers.

In.	Lbs.		In.	Lbs.	
10	Weight, 30¾	$13.00	16	Weight, 38	$19.00
12	" 31½	15.00	18	" 41	21.00
14	" 36	17.00	21		34.00

Dis. 60 and 5%.



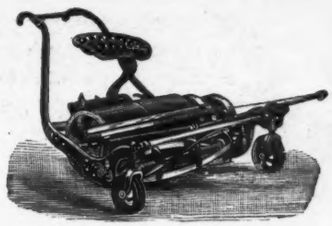
10 in.	12 in.	14 in.
$13.00	$15.00	$17.00
16 in.	18 in.	20 in.
$19.00	$21.00	$23.00

24 in., $30.00.
Geared at both ends.
Dis. 60 and 5 and 5%.

Chadborn & Caldwell Mfg. Co.

10 in. Croquet, 18 pound, mower	$11.00
10 in.	13.00
12 in.	15.00
14 in.	17.00
16 in.	19.00
18 in.	21.00
20 in.	23.00

Dis., 60 and 5% and 5% cash 30 days, f.o.b. New York.



New Excelsior Horse Lawn Mower.

25 in. cut, without shafts or seat	$65.00
30 " with shaft and seat	110.00
35 " " " " "	135.00
40 " " " " "	170.00
Horse boots, per set	12.00

Dis. 50%.

Excelsior Three-Blade Mower and Roller.
8 in., $11.00; 10 in., $13.00; 12 in., $15.00; 14 in., $17.00; 16 in., $19.00; 18 in., $21.00; 20 in., $23.00.
Dis. 60% and 5% cash 30 days f.o.b. New York.

Lemon Squeezers.

THE SAMSON

THE ACME.

The Acme Lemon Squeezers, knife and squeezer, per dozen, $15.00.
The Samson, per dozen, $3.00.

Porcelain lined, No. 1, per doz.	$6.00
25 and 30 % discount.	
Wood. No. 2, per doz.	$3.00
30 % discount.	
Wood, common, per doz.	$1.70

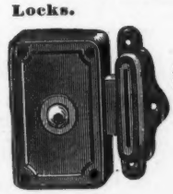
Link Belting.

Link-Belt Machinery Co.'s. Price per running foot net.

No.	Price.	No.	Price
25	$0.13	78	$0.40
32	.13	83	.45
33	.12	85	.50
34	.13	88	.50
35	.14	95	.60
42	.16	103	.75
5	.16	105	.70
41	.20	106	.90
52	.25	107	.80
55	.22	108	.80
57	.24	109	.90
62	.30	114	1.10
66	.30	122	1.50
67	.30	124	1.30
75	.35	146	1.40
77	.35		

Sprocket wheels 25%

Locks.



YALE PATENT.
RIM STORE LATCH.

	Per doz.
3 × 5 in., 4 keys	$48.00
2½ × 4 in., 3 keys	39.00

RIM NIGHT LATCH.

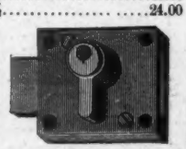
Spring lock, 3 keys	18.00
Dead lock, 3 keys	25.00

NIGHT LATCH.

Escutcheon	39.00
"	36.00

MORTISE DEAD LOCK.

4½ × 3½	45.00
2½ × 3½	24.00

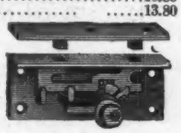


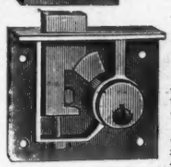
CUPBOARD LOCKS.

Plated Nose	13.20
Brass Nose	12.00

CUPBOARD

Dead Lock	10.80
Spring Lock	13.80





CHEST LOCKS.

Plated nose	19.20
Brass "	18.00

DRAWER LOCK.

Plated nose	10.20
Brass "	9.00

KNOB LOCKS.

5 × 3⅛	22.50
5 × 3⅜	20.00
4¼ × 3⅜	13.25
3½ × 3⅜	10.50

STANDARD LATCHES.
Dead locks.

3¾ × 2¾	24.00
2½ × 3⅜	14.00
1¾ × 2⅜	12.00

NIGHT LATCHES.

3¼ × 3⅜	20.00
2½ × 3¾	18.00

DRAWER LOCKS.
2 × 1⅝, two tumblers.

Plated nose	7.50
Brass "	6.00

Three tumblers.

Plated nose	9.00
Brass "	7.50

RIM FLUSH DRAWER LOCK.
2 in. diameter.

	2 tumblers.	3 tumblers.
Plated nose	7.50	9.00
Brass "	6.00	7.50

BRONZE SPRING PADLOCK.
2 flat steel keys.

In.	
1	11.00
1¼	12.00
1½	13.50
1¾	14.50
2	16.00
2¼	17.50

Subject to special net prices; no discount.

YALE KEYS.

Machinery—Foot Power.

S., M. & Co.'s Screw-Cutting Engine Lathes.
8 in. swing, 20 in. bet. centers, 36 in. bed, 240 lbs. weight, $60.
8 in. swing, 30 in. bet. centers, 46 in. bed, 260 lbs. weight, $70.
8 in. swing, 36 in. bet. centers, 52 in. bed, 280 lbs. weight, $75.
Boxing for export, $2.50 extra; f.o.b. at Cincinnati, 25 % dis.

SAWS AND LATHES.

Victor Scroll Saw, Cuts to 3 Inches.
24-inch swing, with 12 saw blades.... $40
Dis., 20%.

Empire Scroll Saw, Cuts to 3 Inches.
24-in. swing, drill and tilting table.
Price, boxed $25
Dis., 20%

The Acme Combination Saw.
Hand or steam power.
Adjustable table and gauges.

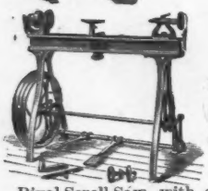
Price, boxed	$40
Scroll saw attachment	7
Boring attachment	10
Moulding attachment	10

Dis., 20%.

Paragon Self Feed Rip Saw.
Two changes of speed; three changes of feed.
Price, with one 10 in. saw, $50.00
Dis., 20%.

Diamond Mortising Machine.
With mortise ¼ to 1 in. wide, 3 in. deep.
" cut tenons ⅛ to ¾ thick, 3 in. wide.
Price, with 3 chisels $25.00
Dis., 20%.

The "Star" Lathe.
Swings 9 × 25 in., back geared screw cutting.
Feeds in or out, right or left. Adjustable Tail Stock for Tapers.
Price.....$75.00
Dis., 15%.



The Crown Lathe.
Swings 10 × 36 in.
Price, boxed..... $45.00
Compound slide rest... 15.00
Countershaft 10.00
Dis., 20%.

Rival Scroll Saw, with six extra saw blades, twist drill and wrench.
Price..... ...$10.00
Lathe attachment..... .....$3.00
Dis., 25%.

The Challenge Scroll Saw, for shell, bone wood, or metal.
Nickel Plated, with six extra saws, twist drill and wrench.
Boxed.....$20.00
With lathe attachment.....$5.00
Dis., 25%.

Hand Circular Rip Saw.

Cuts 3¾ thick, 19 in. wide.

Price $50.00.

Dis.,

W. F. & J. Barnes Co.
Scroll and Circular saw Combined.
Combined Machines.
Combined circular scroll saw and boring attachment—2 circular saws, 12 assorted scroll saws, boring attachment, and self-centering drill chuck.....$50.00
Combined circular and scroll saw—2 circular and 12 scroll saws..... 40.00
Circular saw—1 extra rip and 1 cross-cut saw..... 35.00
Scroll saw—12 assorted scroll saws..... 32.00
Counter shaft for steam power..... 10.00
Dis., 35%.

Foot Power Former.
$20.00; Knives extra, $1.00 each.
Dis., 35%.

Mortising Machine.
$22.00; Chisels, $1.00 each.

Dis., 35%.
Blind Slat Chisels, 3 set bits, $5.00.
Dis., 20%.

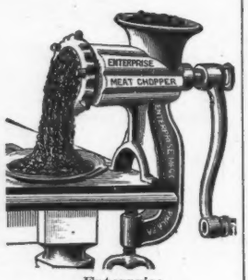
Tenoning Machine,
Price, $25.
Dis., 35%.

Velocipede Scroll Saw,
Without boring attachment..... $20.00
With " " 23.00
1 doz. saw blades, 1 3-16 bit. } Included. Dis., 35%.

Lathe.
3 centres, 1 spur, 2 tool rests and sockets, 1 turned face-plate, $35.
Dis., 30%.

Lathe.
One turned face-plate, two pointed and one spur center, two rests, with sockets and plate for hand tools, slide rest-wrench, belting, etc., $40.
Dis., 25%.

Meat Cutters.



American.	1	2	3	4	Enterprise.	10	12	22	32	42
each,	$5.00	7.00	10.00	25.00	each,	$3.00	2.50	4.00	6.00	15.00

Dis., — —. Dis., 30%.

Motors (Water).

Size No. 8, for Sewing Machines, etc , $18 each.

No. 9, ⅛ horse-power (30 lbs. pressure), ¼ h. p. (50 lbs.), ½ h. p. 100 lbs.), ¾ h. p. (150 lbs.), 1 h. p. (200 lbs.), $30.

No. 10, ¼ horse-power (30 lbs. pressure), ½ h. p. (50 lbs.), 1 h. p. (100 lbs.), 1½ h. p. (150 lbs.), 2 h. p. (200 lbs.), $50.

No. 10½, ½ horse-power (30 lbs. pressure), 1 h. p. (50 lbs), 2 h. p. (100 lbs.), 3 h. p. (150 lbs.), 4 h. p. (200 lbs.), $75.

No. 11, 1 horse-power (30 lbs. pressure), 1½ h. p. (50 lbs.), 3 h. p. (100 lbs.), 4½ h. p. (150 lbs.), 6 h. p. (200 lbs.), $100.

No. 12, 2 horse-power (30 lbs. pressure), 3 h. p. (50 lbs.), 6 h. p. (100 lbs.), 9 h. p. (150 lbs.), 12 h. p. (200 lbs.), $175.

No. 13, 3 horse-power (30 lbs. pressure), 5 h. p. (50 lbs.), 10 h. p. (100 lbs.), 15 h. p. (150 lbs.), 20 h. p. (200 lbs.), $285.
Dis., 40%.

Governors for 11 and 12, $25 extra; for No. 13, $35 extra.

Mining Machinery.

N. B.—Special attention is invited to the goods advertised and illustrated in the advertising pages of the ENGINEERING AND MINING JOURNAL, quotations and discounts upon which would only mislead buyers.

Price-lists and other information may be obtained by addressing the advertisers direct, or by writing to the ENGINEERING AND MINING JOURNAL.

Concentrating Machinery.
Fort Scott Foundry & Machine Works Co.
Blake Improved Crusher: 10x7, weight 7,500; $410.00.
Blake Improved Crusher: 15x9, weight 9,000; $580.00.
Discount 25%.
Cornish Crushing Rollers: 20 diameter, 10 face, weight 5,400; $450.00.
Cornish Crushing Rollers: 20 diameter, 14 face, weight 6,000; $500.00.
Cornish Crushing Rollers: 22 diameter, 14 face, weight 9,500; $625.00.
Cornish Crushing Roilers: 27 diameter, 14 face, weight 13,000; $750.00.
Cornish Crushing Rollers: 30 diameter, 14 face, weight 15,000, $850.00.
Discount 25%.
Complete Sizing Arrangement, consisting of Revolving Screens of Steel Sheet and Hydraulic Classifier.
For Concentrator, 25 tons capacity, $250; 50 tons capacity, $350; 75 tons capacity, $450; 100 tons capacity, $800. Discount, 10 per cent.
Automatic working Jig Machines, all complete, woodword included, with slidemotion: 2 sieves, $300; 3 sieves, $360; 4 sieves, $450.
With Eccentric Motion, all complete, woodwork included: 1 sieves, $200; 2 sieves, $270; 3 sieves, $320; 4 sieves, $330.
Automatic working Double Jig Machines, all complete, woodwork included: 4 sieves, $210; 6 sieves, $335; 8 sieves, $425. Discount, 25 per cent.
Single Rittinger Percussion Tables, all the iron parts, $350; Double Rittinger Percussion Tables, all the iron parts, $500. Discount, 10 per cent.
Improved Rotary Tables, all the iron parts and pipes, $200. Discount, 25 per cent.

Mouse Traps.

The Cyclone Mouse Trap, per gross, $4.05.

The Idea Mouse Trap per gross, $8.25.

Slayer Rat Traps, per gross, $10. Net prices

Nails and Tacks.

Swedes. Tacks.

Per doz.	½	¾	1	1¼	2	2½	3	
½ wt..	35	40	46	50	55	60	65	75
	6	8	10	12	14	16	18	20	24 oz.
	85	1.00	1.20	1.40	1.60	1.75	1.85	2.15	2.55	
Doz. full	½	¾	1	1¼	2	2½	3	4	
weight	60	70	80	90	1.00	1.10	1.20	1.40	
	6	8	10	12	14	16	18	20	24 oz.
	1.60	1.90	2.30	2.70	3.10	3.40	3.80	4.20	5.00	
lb., bulk	½	¾	1	1½	2	2½	3	4	
or paper	1.60	1.25	1.00	80	66	58	52	46	
6	8	10	12	14	16	18	20	24	
36	32	31	30	29	28	28	28	28	

Discount, 67½, 10 and 2%.

O. H. Swedes.
Price, same as Swedes.
Swedes steel tacks same list price as iron.
Discounts, 72½, 10 and 2%.

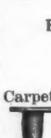
Upholsterers.
Price, same as Swedes.

Cut Tacks. Price per dozen ounces.

¼ wt.....	1	1½	2	2½	3	4	6	8	10
	..	..	..	..	..	35	40	45	50	55
	12	14	16	18	20					
	60	70	80	90	1.00					
⅛ wt.	1	1½	2	2½	3	4	6	8	10	
	45	50	50	55	60	65	70	80	95	
	12	14	16	18	20					
	1.10	1.25	1.40	1.55	1.70					
Full wt ..	1	1½	2	2½	3	4	6	8		
	80	90	90	1.00	1.10	1.20	1.30	1.50		
	10	12	14	16	18	20				
	1.80	2.10	2.40	2.70	3.00	3.30				

Discount, 70, 10 and 2%.

Carpet Tacks, flat and oval heads.



Blued, doz.	oz.	4	6	8	10	12	14	16	18	20
¼ wt.		35	40	45	50	55	65	75	85	95
		22	24							
		1.05	1.15							
" ⅛ wt.		4	6	8	10	12	14	16		
		65	70	80	95	1.10	1.25	1.40		
		18	20	22	24					
		1.55	1.70	1.85	2.00					
Tinned, doz. ¼ wt.		4	6	8	10	12	14	16		
		50	55	60	75	85	1.00	1.10		
		18	20	22	24					
		1.20	1.35	1.45	1.60					
Tinned, doz. ⅛ wt.		4	6	8	10	12	14			
		95	1.05	1.15	1.40	1.60	1.85			
		16	18	20	22	24				
		2.10	2.35	2.60	2.85	3.10				

Discount, 72½, 10 and 2%.

Finishing Nails.

Inch....	⅝	3½-8	4-8	4½-8	⅝	5½-8	6-8	7-8	1
Per lb...	48	40	32	28	26	24	22	20	18

1⅛ and larger.
16
Discount, 60, 10 and 2%.

Chair Nails.
Doz. ½ wt. ; doz. full wt.; pound B. or P.

Inch..	⅜	3½-8	4-8	4½-8	⅝	5½-8	6-8	7-8
Per lb..	51	43	35	31	29	27	25	23
	1	1⅛						
	21	19						

Discount. 60, 10 and 2%.

Common and patent brads.

inch.	Price per doz. ½ wt.	Price per doz. full wt.	Price per lb. in papers or bulk.
2-8.....	.50	1.00	1.25
3-8.....	.60	1.20	.80
4-8.....	.65	1.30	.58
5-8.....	.72	1.44	.48
6-8.....	.80	1.60	.36
7-8.....	.90	1.80	.30
1.....	1.00	2.00	.26
1⅛.....	1.12	2.24	.25
1¼.....	1.26	2.52	.24
1½.....	1.82	3.64	.22
1¾.....	2.25	4.50	.20
2.....	2.43	4.86	.18

Dis. 60, 10 and 2%.

Oils. LUBRICATING.—Fiske Bros.
Lubroleine A cylinder oil 50 in. barrels.
Lubroleine D cylinder oil 40 in. barrels.
Lubroleine A machine oil 45 in. barrels.
Lubroleine B machine oil 35 in. barrels.
Lubroleine A engine oil 50 in. barrels.
Lubroleine B engine oil 40 in. barrels.
In cases 5c gal. extra.
Crescent Axle Grease.—Barrels, 3c per lb; 100-lb. kegs 3½c lb.; 2-lb. decorated tins, $12, gross less 5 per cent.
Texas Star Axle Grease.—Barrels, 2½c per lb.; 100-lb. kegs, 3c per lb.
See Axle Grease, page 2.

Oil Stones.

Best White Washita.	
Green Paper Brand, 8 × 2 × 1⅛ inches.....per lb.	.32
Oil stone, No. 1, " " ..... "	.22½
" Extra, " " ..... "	.30
High rounds, " " ..... "	.30
Round edge slips, Nos. 1, 3½ to 5. in boxes 10 lbs. upwards..... "	.40
Round edge slips, extra, in boxes 10 lbs. upwards..... "	.50
Pen knife pieces, ass't 3 to 5 × 1 × 1⅛, in boxes 10 lbs. upwards..... "	.50
Needle pieces.....per hundred.	$5.00
Wheels, 1½ to 5¾ in. thick.....per inch.	.40
Good Washita,	
Oil Stone No. 1, 8x2x1⅛.....per lb.	.15
" " 2, " ..... "	.12
Axe Stone, assorted sizes..... "	.10
Round Edge Slips, assorted sizes..... "	.35
Arkansas.	
Oil Stone No. 1, 4 to 6 in. long x2x¾ to 1 in. per lb.	$1.35
Oil Stone No. 1, 6 to 9 in. long x2x¾ to 1 in. "	1.75
Oil Stone No. 2, 4 to 9 in. long x2x¾ to 1 in. "	.75
Round Edged Slips, assorted sizes .. .. "	2.00
Square File Slips, 3 to 4 inches long.....per doz.	1.75
Diamonds, 3½ to 4 inches long..... "	3.00
Triangulars, 3½ to 4 inches long..... "	3.00
Flat Files, 3 to 4 inches long..... "	2.00
Beveled Files, 3½ to 4 inches long..... "	2.50
Knife Blades, 3 to 4 inches long..... "	3.00
Points, extra long, 3 to 3½ inches..... "	2.00
Points..... "	1.50
Pen Knife Pieces, assorted sizes.....per lb.	2.00
Needle Pieces .....per hund.	8.00
Wheels, 2 to 4 inches. ⅛ inch thick.....per inch	1.25
Oil Stone Powder.....per lb.	15

10, 10 and 2½ dis.

Oil Stoves.

Burns 8 hours; holds 1 quart oil.

Nickel plated crown plate, per doz., $12.

Packing. SELDEN'S PATENT.
For Steam, Air, Water and Ammonia.
With Rubber Core, 60 cents per lb.
Dis., 25 and 5%.
With canvas core, 50 cents per lb.
Dis., 30 and 5%.
Hine & Robertson.
Eureka, 75c. per lb. Dis., 40%.
Soapstone—Standard, 8c. per lb.
XX. 11c. per lb.
Crown—No. 1, 23c. per lb.
No. 2, 26c. per lb.
Climax, 9c. per lb. Net.
See Rubber Packing, page 7.

Paints.

For Assorted Cans of 1, 2, 3 and 5 pounds.	lb. c.	100-lb. cases.	lb. c.
No.		No.	
533. Scotch yellow	18	583. Black	18
534. Lead color	18	584. Dark blue	25
536. Brown	18	585. Chrome yellow	30
537. Light drab	18	586. Vermilion	30
539. Buff	18	587. Indian red	25
542. Warm drab	25	588. Bronze green	25
544. Dark green	25	589. Quaker green	25
581. Light green	25	546. Inside white	18
582. Norway red	18	547. Outside white	18

Discount 50 per cent.

Ordinary shades. Per gal.		Per gal.
One to 5 gallon cans	$1.90	Half gallon cans $2.00

Tuscan Red, Green and Yellow.

Per gal.		Per gal.
One to 5 gallon cans	$3.10	Half gallon cans $3.30

Vermilion.

Per gal.		Per gal.
One to 5 gallon cans	$5.00	Half gallon cans $5.20

Discount 40 per cent.

The list in barrels, half-barrels and kegs (of 5 gallons or larger) will be 10c. a gallon less than in gallon cans. Kegs of less than 5 gallons will be charged at gallon price. One-quarter gallon cans not put up. Special shades made to order.
Special cash discount for large orders.

Parers and Corers.

SAML. LEES & CO.

List, $9 per gross.

Portable Houses. (Ducker Portable House.

Weight, 450 lbs.

Price, $150.

Closes securely.

Dis., 10%.

Weight, 85 lbs. per section.

Price, $220.

Dis., 10%.

No. 10.—26 × 33 ft., including veranda and rear extension. Main part, 19 × 26 ft. $500.00

Post Hole Diggers.

Chieftain Hay Rake Co.

Little Giant	$36.00	doz 11 cu ft.
Hercules	30.00	" " " "
New Champion	20.00	" " " "
Scheidler	36.00	" " " "

Dis. 40% f.o.b. New York or Boston.

Press.

Combined press for cutting, forming, horning and seaming.

Particulars of flat front presses, including beds, slides, bolsters, plates, etc.

Prices are net, delivered on steamers in New York, including insurance, etc.

Nominal size of press	41	42	43	44	450
Price, including et ceteras	$130	$200	$260	$420	$660
Weight, about lbs	600	1050	1900	3600	7200
Greatest diameter that can be wired ins	5	7	10	14	20
Greatest depth that can be wired ins	8	10	13	16½	20
Hole through bed—circle intersecting ins	4½	6	8½	12	17
Hole through back—width ins	8	9½	12	15½	20½
Width between die clamps—clear ins	8	11	15	20	27
Distance back from center of slide bar ins	4½	5½	7	9	12
Height to slide-bar, when up ins	5¼	6½	7½	8½	9
Stroke of slide-bar ins	1	1¼	1½	1¾	2
Adjustment of slide-bar ins	1	1¼	1½	1¾	2
Diameter of fly-wheel ins	20	26	32	38	44
Width of fly-wheel ins	3	4	5	6	7
Weight of fly-wheel, about lbs	125	250	420	725	1100
Speed per minute, about rev	120	110	100	90	80
Cubic feet boxed, about	30	40	50	60	70

Printers' Sundries.

Vanderburgh, Wells & Co.
And Liberty Machine Works.
Wood rules, 12 cents per yard.
Wood rules, on end wood, 15 cents per foot.

EUREKA STAND.
12 full cases.
Price without cases $12.00
Boxing and cartage 1.25

SHOOTING STICKS.

Each.
No. 1, 75c.
No. 2, $1.
No. 4, 45c., black.
No. 4, 60c., bright.
No. 5, 60c., black.
No. 5, 75c., bright.

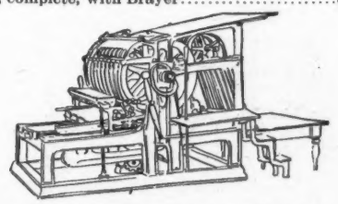
GAUGE PINS—ALL SIZES.
Brass, 40c. doz. | Steel, 60c. doz.
Wire, 25c. doz. | Golden, 40c. doz.

MITRE BOXES.
Regular size, 2 in., 50c. each.
Extra size, 3½ in., 75c. each.

LEAD CUTTER.

Curtis' Lead Cutter $2.00

PROOF PRESS, "OUR OWN."
9 × 32, complete, with Brayer $28.00



THE "LIBERTY" CYLINDER PRESS.
For Newspaper and Job Printing.

Bed.	Form.	
No. 5—29 × 42	24 × 40	$1,200
6—33 × 47	28½ × 45	1,300
7—37 × 51	33 × 49	1,600

Dis., 20 and 5%.

THE "LIBERTY" JOB PRINTING PRESS.
Size of chase.

No. 2 — 7	× 11	$200
2a— 9	× 13	250
3 —10	× 15	300
3a—11	× 17	350
4 —13	× 19	400
5 —14½	× 22	500

Dis., 12½ and 5%.

Two sizes built extra strong for boxmakers, embossing, etc.
No. 3a—11 × 17 ..... $375
4 —13 × 19 425
Dis., 12 and 5%.

Fountains, either size, $25 extra, if ordered with press. Steam fixtures, either size, $15 extra.

THE AMERICAN CARD AND BILL HEAD PRESS.

No. 5—4 ×	6	$1
7—6 ×	9	3
8—8 ×	12	6

Dis., 20% and 5%.

THE "LIBERTY" PAPER CUTTER.

Cuts 30 inches $140.00
Extra knife 18.80
Dis., 12½ and 5%.

THE "LIBERTY" IMPOSING TABLES

Marble top.

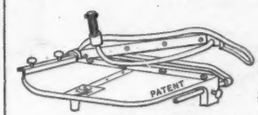
No. 1—24 × 36	$24
2—32 × 48	38
3—26 × 74	44
4—36 × 48	48

Dis., 12½ and 5%.

Slate Top.

No. 1—24 × 36	$18
2—32 × 48	25
3—26 × 74	32

Dis., 12½ and 5%.

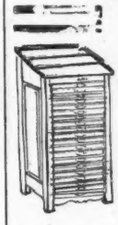


Kelsey & Co.,

The Eagle Card and Paper Cutter, 24½ inch,

$12 each, $100 per doz.

THE "LIBERTY" TYPE CABINETS.



Number of cases.	Stained. Flat.	Stained. Galley.*	Grained. Flat.	Grained. Galley.*
	$	$	$	$
12⅞	12.00	14.50	14.00	17.00
16⅞	15.00	17.50	17.00	20.00
18⅞	16.50	19.00	18.50	21.50
20⅞	18.00	20.50	20.00	23.00
12¾	15.00	17.50	17.00	20.00
16¾	18.00	20.50	20.00	23.00
18¾	19.50	22.00	21.50	24.50
20¾	22.00	24.50	23.00	26.00
12 full	18.00	20.50	20.00	23.00
16 "	22.00	24.50	24.00	27.00
18 "	24.00	26.50	26.00	29.00
20 "	26.00	28.50	28.00	31.00

Number of cases.	Pine. Flat.	Pine. Galley.*	Cherry. Flat.	Cherry. Galley.*	Napanoch. Flat.	Napanoch. Galley.*	Walnut. Flat.	Walnut. Galley.*
	$	$	$	$	$	$	$	$
12⅞	18.00	21.00	20.00	23.00	22.00	25.00	23.00	26.00
16⅞	22.00	25.00	24.00	27.00	26.00	29.00	27.00	30.00
18⅞	24.00	27.00	.....	.....	.....	.....	.....	.....
20⅞	26.00	29.00	28.00	31.00	30.00	33.00	31.00	34.00
12¾	21.00	24.00	23.00	26.00	25.00	28.00	26.00	29.00
16¾	25.00	28.00	27.00	30.00	29.00	32.00	30.00	33.00
18¾	27.00	30.00	.....	.....	.....	.....	.....	.....
20¾	29.00	32.00	31.00	34.00	33.00	36.00	34.00	37.00
12 full	24.00	27.00	26.00	29.00	28.00	31.00	29.00	32.00
16 "	28.00	31.00	30.00	33.00	32.00	35.00	33.00	36.00
18 "	30.00	33.00	.....	.....	.....	.....	.....	.....
20 "	32.00	35.00	34.00	37.00	36.00	39.00	37.00	40.00

*Furnished with galley top and extra drawer for copy.
Dis., 20 and 5%.

THE "LIBERTY" CASE STANDS AND RACKS.
Stands.

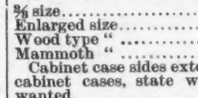
Single, without racks	$3.75
" with racks for 8 full cases	4.00
Single, with racks for 10 full cases	4.25
Single, with racks for 12 full cases	4.50
Single, with racks for 14 full cases	4.75
Double, without racks	4.25
" with racks for 8 full cases	4.50
Double, with racks for 16 full cases, and gal. rest	6.25
Double, with racks for 20 full cases and gal. rest	6.50
" " " " 24 " " " " "	6.75
" " " " 24 ⅔ cases	5.25
" " " " 8 full and 8 ⅔ cases	5.00
" " " " 8 " " 8 ¾ "	5.25
" " " " 10 " " 12 ⅔ "	5.55
" " " " 12 " " 16 ⅔ "	5.70
" " " " 12 " " 16 ¾ "	6.05
Stands with closed ends, extra	2.00
Extra slides for stands, each	.00

Case Racks.

Cases.	Inches High.	Price.	Inclosed Back and Sides.	Cases.	Inches High.	Price.	Inclosed Back and Sides.
12	41	$6.00	$8.50	30	84	$10.00	$13.50
16	50	7.00	9.50	32	51	12.50	16.00
20	60	8.00	11.00	40	60	14.00	17.50
24	70	9.00	12.00	60	84	18.00	23.00

Dis., 20 and 5%.

THE "LIBERTY" TYPE CASES.



Name.	Outside Measurements.
Ful size	32¼x16½x1 9-16
Rooker size	28⅝x14¼x1 9-16
¾ size	26x16½x1⅝
⅔ size	23⅝x16½x1⅝
Enlarged size	32¼x23x2 3-16
Wood type "	32¼x23x1 9-16
Mammoth "	44x23x1 9-16

Cabinet case sides extend 1½ to 3 inches. In ordering cabinet cases, state whether high or low fonts are wanted.

	Without Pat. Clasps.	With Pat. Clasps.
News, full, per pair	$1.60	$1.75
" Rocker, "	1.60	1.75
" ¾ "	1.50	1.60
" ⅔ "	1.40	1.50
German, full, "	1 60	1.75
Music " "	2 00	2.20
Job " "	.90	1.00
Job, full size, California	.90	1.00
" Rooker	.90	1.00
" full, Yankee	.90	1.00
" ¾ Regular	.80	.90
" ⅔ Yankee	.75	.85
" " Boston	.75	.85
" " California	.75	.85
" " improved	.90	1.00
" full size, Middletown	1.20	....
" " Paterson	.90	....
" " New York	.90	1.00
Quadruple, full size	1.20	....
Double lower, "	1.20	....

Name.	Without pat. clasps.	With pat. clasps.
Galley lower, full size	$1.10	
Enlarged Yankee job	2.20	
Enlarged German	2.20	
Founder's sort case	2.20	
Half-cap	.50	
L. S. lead, full-size	1.00	
" rule "	1.15	$1.25
" " ¾ size	.95	1.05
" " ⅔ "	.80	.90
Improved, ⅔ "	.90	1.00
Space and quad, full-size	1.00	
Slug "	1.00	
Figure "	.90	
Triple "	.90	1.00
Improved triple "	.90	1.00
Triple, ¾ size	.80	.90
Blank, full-size	.65	
" ¾ size	.55	
" ⅔ size	.50	
Script, full-size	.90	
" ¾ size	.80	
" ⅔ size	.75	
Wood type, 23x32¼	1.10	
Mammoth, 23x44	1.30	
Metal furniture, full-size	1.25	
Border "	1.25	
" ⅔ size	1.00	
Leader, ¾ size, per pair	1.40	
Butler jobs, full-size, per pair	3.00	
For pulls on cabinet cases add per case		.10
For rollers " " "		.30

Dis., 25 and 5%.

THE "LIBERTY" GALLEYS.
All brass "indestructible."

Single, 3¾ x 23¾ inside	$1.50
" 3¾ x 15¾ "	2.00
" 3¾ x 11¾ "	1.75
Medium, 5 x 23¾ inside	2.75
Double, 6¼ x 23¾ inside	3.00

Dis., 33⅓%.

SMOOTH LINED NEWS GALLEYS.

Half-lined.	Full-lined.	Half-lined.	Full-lined
Single col. $1.75	$2.00	Double col. $2.00.	$2.50

Dis., 20% and 5%.

SCREW GALLEYS.

	Unlined.	Half-lined.	Full-lined.
Single column	$1.25	$1.50	$1.75
Double column	1.50	1.75	2.00

Dis., 20% and 5%.

SMOOTH LINED JOB GALLEYS.

Size.	Unlined.	Full-lined.	Size.	Unlined.	Full-lined.
6 × 10	$1.25	$2.00	12 × 18	$2.50	$3.50
8¼ × 13	1.50	2.50	14 × 20	3.00	4.00
9 × 14	1.75	2.75	15 × 22	3.50	5.00
10 × 16	2.00	3.00	18 × 25	4.00	5.50

Dis.. 20% and 5%.

RULED GALLEYS.

These have a rule laid out on one of the rims, divided into quarter inches, by which to set advertisements. Cost of ruling extra, 25 cents.

Dis., 20% and 5%.

MAILING GALLEYS.

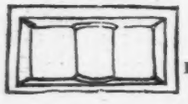
Zinc bottom, 50 cents; brass bottom, 90 cents. Brass closed both ends, $3.

Dis., 20% and 5%.

GALLEY RACKS.
From $3 up.

LEAD CUTTERS,
From $2 up.
Dis., 20% and 5%.

THE "LIBERTY" STEEL SHOOTING STICKS.
Bright, $1 each.
Nickelplated, $1.25 each.
Dis., 40%.



STANDARD METAL FURNITURE
25c. a pound.
In fonts of 25, 50, 75 and 100 lbs.
Dis., 15%.

THE "LIBERTY" MALLETS.

Hickory, small	$ .20
" medium	.25
" large	.30
" iron bound	1.00
Lignum Vitæ, No. 4	.30
" " No. 3	.40
" " No. 2	.50
" " No. 1	.70

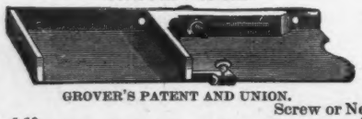
Dis. 20 and 5%.

THE "LIBERTY" PLANERS AND PROOF PLANERS.

Midget planer	10c.
Small Maple	20c.
Large "	25c.
" b'ked with leather	30c.
Midget " "	12c.

Proof planer, faced with cloth, 50c.
Dis., 40%.

COMPOSING STICKS.



GROVER'S PATENT AND UNION.

Screw or Nevs.	
6 in., 1.10	$ .90
8 " 1.20	1.10
10 " 1.40	1.20
12 " 1.60	1.40
14 " 1.80	1.60
16 " 2.00	1.80
18 " 2.20	2.00
20 " 2.40	2.20

Composing rules, 14 ems pica and under, 25 cents.

THE "LIBERTY" COMPOSING STICKS.

Grover.

6 in., Steel	$ .90	16 in., Steel	$1.80
8 " "	1.00	18 " "	2.00
10 " "	1.30	20 " "	2.20
12 " "	1.40	Extra Clasp	.10
14 " "	1.60	Extra Knee	.40

Screw.

6 in., Steel	$ .75	16 in., Steel	$1.45
8 " "	.80	18 " "	1.60
10 " "	1.00	20 " "	1.75
12 " "	1.15	Extra Knee	.30
14 " "	1.30	" Screw and Nut.	.10

Dis., 40%.

Yankee.

6-in., Steel	$ .75	12 in., Steel	$1.15
8 " "	.80	Extra Knee	.30
10 " "	1.00	" Clamp and Screw	.15

Other Sizes to Order.
Dis., 40%.

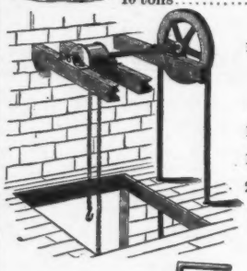
Albion.

6-in., Steel	$1.00	6-in. German Silver	$1.50
8 " "	1.10	8 " " "	1.75
Extra Knee	.40	Extra Screw and Nut.	.10

Pulley Blocks.

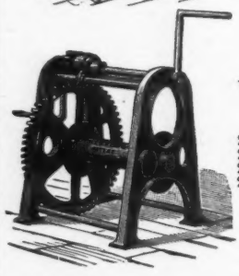
WESTON DIRECT.

	Each.
⅛ ton	$10
¼ ton	13
½ ton	15
1 ton	20
1½ tons	25
2 tons	30
3 tons	40
Geared.	
1 ton	35
2 tons	45
3 tons	60
4 tons	80
5 tons	110
6 tons	150
8 tons	210
10 tons	275



DOUBLE LIFT HOISTS FOR HATCHWAYS, ETC.

500 lbs	$25.00
1000 "	50.00
1500 "	65.00
2000 "	80.00
500 "	30.00



WESTON CRAB SAFETY BRAKE, HANDLES CANNOT FLY BACK.

	Each.
21	$35.00
22	45.00
23	65.00
25	100.00

Pumps.

Prices on all pumps include cylinders.

No.	Dia. Cyl.	Suction.	Cap. stroke.	Price Iron.	Price Brass cyl.
0	2 in.	1 in.	1-15 gal.	$3.50	.....
1	2¼ "	1 "	1-12 "	4.00	$6.00
2	2⅝ "	1¼ "	1-11 "	4.50	7.00
3	2½ "	1¼ "	1-10 "	5.00	8.00
4	3 "	1¼ "	1-6 "	5.50	10.00
5	3¼ "	2 "	1-5 "	6.50	14.00
6	3½ "	2 "	1-4 "	8.00	18.00
7	4 "	2½ "	1-3 "	12.00	20.00

Dis., 65%.

1	2½ in.	1¼ in.	1-10 gal.	4.25	.....
2	3 "	1¼ "	1-7 "	4.75	.....
3	3½ "	1¼ "	1-5 "	5.25	.....
4	4 "	1½ "	1-4 "	5.75	.....
5	4½ "	1½ "	1-3 "	6.25	.....

Dis., 70%.

Standard and Cylinder for 1½ in. Iron Pipe, $16.00.

Dis., 55%

No. 6½, sta and cylinder, 1¼ in. pipe, $13.00.
No. 7½, standard and cylinder, 1¼ in. pipe, $15.00.
No. 8½, standard and cylinder, 1½ in. pipe, $18.00.
With hose and discharge pipe, add $3.00 to list price.
Dis., 55%.

No. 1, diam. cyl., 2½ in.; cap. stroke, 1-8 gal.; size pipe, 1¼ in. Price, iron, $12.50; brass cyl., $17.50.
No. 2, diam. cyl., 3 in.; cap. stroke, 1-6 gal.; size pipe, 1¼ or 1½ in. Price, iron, $14.50; brass cyl., $18.50.
No. 3, diam. cyl., 4 in.; cap. stroke, 2-5 gal.; size pipe, 1½ or 2 in. Price, iron, $23.50; brass cyl., $34.50.
Dis., 55%.

No. 1, diam. cyl., 3 in.; suction, 1¼ in. cap. stroke, 3-10 gal. Price, iron, $28.00; brass cyl., $38.00.
No. 2, diam. cyl., 4 in.; suction, 1½ in.; cap. stroke, 1-2 gal. Price, iron, $32.00; brass cyl., $60.00.
No. 3, diam. cyl., 5 in.; suction, 2 in.; cap. stroke, 6-7 gal. Price, iron, $35.00; brass cyl., $90.00.
No. 4, diam. cyl., 6 in.; suction, 2½ in.; cap. stroke, 1 1-5 gal. Price, iron, $45.00; brass cyl. $120.00.

Dis., 45%.

No.	Diam. cyl.	Cap. stroke.	Stroke.	Pipe.	Price.
0	2 in.	1-11 gal.	7 in.	1 in.	$21.50
00	2½ "	1-7 "	7 "	1¼ "	23.00
1	3 "	1-5 "	7 "	1½ "	25.25
2	3½ "	1-3 "	7 "	1½ "	27.25
3	4 "	4-10 "	7 "	2 "	30.50
3½	4½ "	1-2 "	7 "	2 "	37.50
4	5 "	8-10 "	10 "	2½ "	44.00
4½	5½ " 1	"	10 "	2½ "	47.00
5	6 " 1 1-5	"	10 "	3 "	50.00

Dis., 40%.

No.	Diam. cyl.	Cap. stroke.	Diam. pipe.	Price. Iron.	Price. Br's cyl.
1	2 in.	1-5 gal.	1 in.	$39	$51
2	2½ "	1-3 "	1¼ "	41	56
3	3 "	1-2 "	1½ "	45	62
4	3½ "	6-7 "	2 "	51	81
5	4 "	7-8 "	2 "	63	114
6	4½ " 1	"	2 "	80	155

Dis., 40%.

With Tight and Loose Pulleys.

No. 1, cap. per rev., 1-6 gal.; size of pipe, 1¼ in.; price, iron, $26; bronze, $45.
No. 2, cap. per rev., 1-5 gal.; size of pipe, 1½ in.; price, iron, $31; bronze, $55.
No. 4, cap. per rev., 1-3 gal.; size of pipe, 2 in.; price, iron, $48; bronze, $75.
Pulleys on Nos. 1 and 2 are 8 in. diam., 2½ in. face; on No. 4, 12 in. diam., 3½ in face.
Balance wheels for above pumps. $1, $2, and $3, according to size.
Dis., 45%.

No. 2, ½ to 2 gal. per min.; length of drive pipe, 25 to 40 ft.; calibre of pipes, drive, ¾ in.; discharge, ⅜ in.; price, $9.
No. 3, 1 to 4 gal per min.; length of drive pipe, 25 to 40 ft.; calibre of pipes, drive, 1 in.; discharge, ⅝ in.; price, $11.
No. 4, 2 to 8 gal. per min.; length of drive pipe, 25 to 40 ft.; calibre of pipes, drive, 1½ in.; discharge, ½ in.; price, $14.
No. 5, 3 to 14 gal, per min.; length of drive pipe, 25 to 40 ft.; calabre of pipes, drive, 2 in.; discharge, 1 in.; price, $22.
No. 6, 4 to 25 gal. per min.; length of drive pipe, 30 to 40 ft.; calibre of pipes, drive, 2½ in.; discharge, 1¼ in.; price, $40.
No. 7, 8 to 60 gals. per min.; length of drive pipe, 30 to 40 ft.; calibre of pipes, drive, 4 in.; discharge, 2 in.; price, $75.
No. 8, 12 to 120 gal. per min.; length of drive pipe, 30 to 50 ft.; calibre of pipes, drive, 6 in.; discoarge, 2½ in.; price, $125.

Dis., 45%.

Railroad Dumping Cars and Carts.

A. C. McEWEN.

Cars.	Gauge.	Cap.	Net	Cap.	Net	Cap.	Net
Side Dumping	24"	1 c. y.	$55	2 c. y.	$65	3 c. y.	$75*
End "	" "	" "	55	" "	65	" "	75*
Revolving "	" "	" "	70	" "	80	" "	90*
Bottom "	" "	" "	80	" "	90	" "	100*
Tunnel	" "	" "	55	" "	65	" "	75*
Mine	" "	" "	50	" "	60	" "	70*
Plantation	30"		43				
Logging	36"		170				
"	4' 8½"		185				
Hand	36"		45				
"	4' 8½"		50				
Push	36"		40				
"	4' 8½"		45				
R.R. Construction	36"		60				
"	4' 8½"		65				
Carts.							
Plantation and Railroad Wagons.			45 to 75				
McEwen Patent Dumping		1 "	175	1½ "	200		

*These cars built of any gauge from 18" to 56½" and of any capacity from ½ to 6 cu. yd.

Refrigerators.

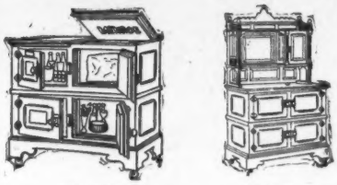
Indurated Fibre and Stoneware-Lined.

Cordley & Hayes.

No. 35.

Nos. 75, 85.

No.	High.	Wide.	Deep.	Price.
35	46¼	28¾	20¼	$20.00
75	44¼	33¼	23½	28.00
85	47¾	38	23½	34.00



No. 2. No. 6.

No.	High.	Wide.	Deep.	Price.
2	41	46	26	$36.00
6	84	46	26	60.00

Mirror 16 by 18 in. Dis., 30 and 5%.

Roofing. Thompson Mfg. Co.

CORRUGATED IRON.

2½ inch corrugations.

PRICE LIST.

Gauge.		Per square.
No. 18,	Painted Red	$8.80
No. 20,	" "	6.90
No. 22,	" "	6.00
No. 24,	" "	5.15
No. 26,	" "	4.50
No. 27,	" "	4.15
No. 28,	" "	4.10
No. 20,	Galvanized	10.15
No. 22,	"	8.85
No. 24,	"	7.60
No. 26,	"	6.60
No. 27,	"	6.50
No. 28,	"	6.35

Discounts next issue.

Slate.

F. o. b. New York. Stowage allowed.

Purple and Green, per 100 feet sq. $4.50
Dark blue, per 100 feet sq. 4.10
Sizes, 24 × 12 = 115 to sq., 650 lbs. weight.
Sizes, 20 × 10 = 170 to sq., 650 lbs. weight.

Sash Chains. Phosphor Bronze Smelting Co.

No. A. "Giant" metal, 15c. pr. ft., wts. not over 125 lbs.
No. 1. "Giant" metal, 12c. pr. ft., wts. not over 75 lbs.
No. 2. "Giant" metal, 10c. pr. ft., wts. not over 40 lbs.
No. 0. "Giant" metal, 8c. pr. ft., wts. not over 25 lbs.
No. 1. Red metal, 10c. pr. ft., wts. not over 40 lbs.
No. 2. Red metal, 8c. pr. ft., wts. not over 30 lbs.
No. 0. Red metal, 6c. pr. ft., wts. not over 15 lbs.
No. 1. Steel, 8c. pr. ft., wts. not 75 lbs.
No. 2. Steel, 6c. pr. ft., wts. not over 30 lbs.
No. 0. Steel, 4c. pr. ft., wts. not over 15 lbs.
No. 1. Steel, black enameled, 9c. pr. ft., wts. not over 75 lbs.
No. 2. Steel, black enameled, 7c. pr. ft., wts. not over 30 lbs.
No. 0. Steel, black enameled, 5c. pr. ft., wts. not over 15 lbs.

Fastenings for hanging a window of 2 sashes for Nos. 1 and 2 chains, consisting of 4 hooks, 4 rings, 4 sash irons, a set, 18c. per set.

Fastenings for hanging a window of 2 sashes for No. 0 chains, 14c. per set.

Dis. on "Giant" metal chain	40	10	10%	
" " Red metal chain	40	10	10	10%
" " Steel " "	40	10	10	10%
" " Fastenings	40	10	10%	

Scales.—Discount on all scales 50 per cent.

Postal scales.

No. 1, capacity ½ to 9 oz. $3.00.
No. 2, capacity ½ to 12 oz., $4.00.
No. 3, capacity ½ to 34 oz. $6.00
No. 4, capacity ½ oz. to 4 lbs., $8.00

Even balance trip scales, seamless scoop, with weights.

No. 1, capacity ½ oz. to 2 lbs., tin scoop, $5.50 brass scoop, $6.50.
No. 2, capacity ½ oz. to 4 lbs., tin scoop, $6.50; brass scoop, $7.50.
No. 2½, capacity ½ oz. to 18 lbs , tin scoop $11; brass scoop, $12.50.

Butter Trip Scales, slab, weights and scoop.

No. 7, ½ oz. to 10 lbs., 10 in. slab,	without	side beam	$10.50
" " " " " "	with	" "	11.50
" 8 " " 20 lbs., 12 in. "	without	"	12.50
" " " " " " "	"	"	13.50

Tea Scales—All Seamless Scoops.

Capacity.	Scoop.	Capacity.	Scoop.
¼ oz. to 10 lbs.	Tin ..$8.00	¼ oz. to 10 lbs.	Brass .. 9.00

Druggists.

Capacity.	Scoop.	Capacity.	Scoop.
1-16 oz. to 8 lbs.	Tin ..$10.00	1-16 oz. to 8 lbs.	Brass..$11.00

Counter.

Capacity.	Scoop.	Capacity.	Scoop.
½ oz. to 36 lbs.	Tin ..$10.00	½ oz. to 36 lbs.	Brass..$12.00

Grocer.

Capacity.	Scoop.	Capacity.	Scoop.
½ oz. to 62 lbs.	Tin ..$12.00	½ oz. to 62 lbs.	Brass..$14.00

Meat or Butter Scales, with Slab.

½ oz. to 62 lbs.,	with Single Beam	$14.00
" " " "	Double "	15.00

Patent Boston platform, 13½ in. long by 10 in. wide.

Pillar, 18 in. high, double beam, marked both sides.

With large seamless tin scoop, $25.00
" " " " brass " 27.00

Platform scales. Without Wheels.

No.	Capacity.	Platform.	Price.
1	400 lbs.	21½ by 15 inches.	$23.00
2	600 lbs.	25 by 16 "	30.00
3	800 lbs.	25 by 17 "	34.00
4	1,000 lbs.	26 by 17 "	39.00
5	1,200 lbs.	28 by 20 "	45.00
6	1,600 lbs.	29 by 21 "	55.00
7	2,000 lbs.	32 by 23 "	70.00

With Wheels.

No.	Capacity.	Platform.	Price.
1	400 lbs.	21½ by 15 inches.	$26.00
2	600 lbs.	25 by 16 "	33.00
3	800 lbs.	25 by 17 "	38.00
4	1,000 lbs.	26 by 17 "	43.00
5	1,200 lbs.	28 by 20 "	49.00
6	1,600 lbs.	29 by 21 "	60.00
7	2,000 lbs.	32 by 23 "	75.00

Brass sliding poise at same price if so specified in order

With Wheels and Drop Lever.

No.	Capacity.	Platform.	Price.
4	1,000 lbs.	26 by 17 inches.	$51.00
5	1,200 lbs.	28 by 20 "	59.00
6	1,600 lbs.	29 by 21 "	70.00
7	2,000 lbs.	32 by 23 "	82.00
8	2,500 lbs.	33¾ by 24¾ "	94.00
9	3,000 lbs.	38 by 30 "	125.00

School Slates.

Noiseless School Slates.

Winsboro Cord Bound.

Size.	Doz. in case.	Price per case.
5 by 7	18	$18.00
6 by 9	12	15.00
7 by 11	10	14.40
8 by 12	8	14.00
9 by 13	6	12.00

Dis., 50 and 2½%.

"D" School Slates.

Winsboro Oval Round Corner

	Doz. in case.	Price per case.
4 by 6	24	$10.80
5 by 7	18	9.00
6 by 8	12	8.20
6 by 9	12	8.64
6½ by 10	12	9.00
7 by 10	10	7.70
7 by 11	10	8.00
8 by 12	8	8.00
9 by 13	6	7.20

Dis., 200 case lots, 50 and 2½%.

Shears. The Patent "Eureka

No. 1 cuts round metal up to ¼ in. steel to ⅛, $12.

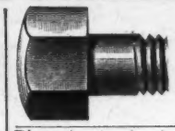
No. 2 cuts round metal up to ½ in., steel to 3-16, $20.

Discount, 25%.

Steel Wire Mats.

Galvanized Steel Wire.			(Style A) "Hartman Flexible." Each
No. 2.	Size 16x24.		$1.50
No. 3.	" 18x30.	"	2.00
No. 4.	" 22x36.	"	3.00
No. 5.	" 26x48.	"	4.50
No. 6.	" 30x48.	"	5.25
No. 7.	" 36x48.	"	6.50
No. 8.	" 36x60.	"	8.00
No. 9.	" 36x72.	"	10.00

Brass mats "list" double the price of galvanized (Style A) for similar sizes.
3 doz. lots, dis. 33 1-3%.
6 doz. lots, dis. 40%.
12 doz. lots, dis. 40 and 5%.



Screws.

STEEL SCREWS ADD 50% TO LIST.

Prices are per 100.

Hexagon Cap Screws.

Heads on Steam-tight Screws not polished, unless so ordered. Can make these 12 inches long.

Diam. head.	7-16	½	9-16	⅝	¾	13-16	⅞	1	1⅛	1¼	1⅜
Length head.	¼	5-16	⅜	7-16	½	9-16	⅝	¾	⅞	1	1⅛
Diam. screw.	¼	5-16	⅜	7-16	½	9-16	⅝	¾	⅞		1⅛
¾	3.00	3.25	3.75	4.40	5.50	7.00					
1	3.25	3.50	4.00	4.70	5.70	7.00	9.50				
1¼	3.50	3.75	4.25	5.00	6.00	7.50	9.50	12.20			
1½	3.75	4.00	4.50	5.30	6.30	8.00	10.00	12.20	16.00		
1¾	4.00	4.25	4.75	5.60	6.60	8.50	10.60	12.80	16.60	21.20	
2	4.25	4.60	5.05	5.95	7.00	9.10	11.20	13.40	17.20	22.30	29.00
2¼		5.00	5.40	6.35	7.50	9.70	11.90	14.10	17.90	23.60	30.50
2½			5.80	6.80	8.00	10.40	12.70	14.90	18.80	25.10	32.30
2¾				7.30	8.60	11.20	13.60	15.90	20.00	26.90	34.40
3					9.30	12.10	14.70	17.00	21.80	29.00	37.00
Thread to in.	20	18	16	14	12	12	11	10	9	8	7
Add for each ¼ in.	30	40	50	60	80	1.00	1.30	1.60	2.00	2.40	3.00

Dis., heads ground, 60%; dis., heads black, 60 and 5%; dis., heads extra finish, 50%; dis., heads case-hardened, 5%; dis., heads polished after hardening, 45%.

SQUARE CAP SCREWS.

Diam. head.	⅜	7-16	½	9-16	⅝	11/16	¾	⅞	1⅛	1¼	1⅜
Length head.	¼	5-16	⅜	7-16	½	9-16	⅝	¾	⅞	1	1⅛
Diam screw.	¼	5-16	⅜	7-16	½	9-16	⅝	¾	⅞	1	1⅛
¾	2.40	2.75	3.20	3.80	4.40	5.75					
1	2.60	2.95	3.40	4.00	4.70	5.75	7.70				
1¼	2.75	3.10	3.65	4.20	4.95	6.05	7.70	10.50			
1½	2.90	3.30	3.85	4.45	5.25	6.35	8.25	10.50	14.00		
1¾	3.05	3.50	4.10	4.70	5.55	6.65	8.80	11.10	14.80	18.00	
2	3.25	3.70	4.35	4.95	5.90	7.05	9.40	11.80	15.70	19.00	22.50
2¼		4.00	4.65	5.25	6.30	7.55	10.10	12.60	16.70	20.20	24.00
2½			5.00	5.60	6.75	8.15	10.90	13.50	17.80	21.50	25.80
2¾				6.00	7.25	8.85	11.80	14.60	19.10	23.10	27.90
3					7.80	9.65	12.80	15.90	20.60	25.00	30.50
Thread to in.	20	18	16	14	12	12	11	10	9	8	7
Add for each ¼ in.	25	35	45	55	65	90	1.20	1.50	1.80	2.30	3.00

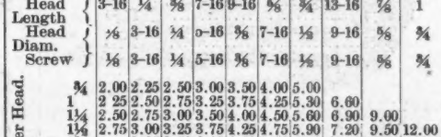
Dis., heads ground, 65%; dis., heads black, 65 and 5%; dis., heads extra finish, 55%; dis., heads case harden ed, 60%; dis., heads polished-hardened, 50%.

MILLED HEADS, COLLAR SCREWS

Diameter of Collar.	¼	11/32	7/16	½	⅝	11/16	13/16	15/16	1	1¼
Diameter of Screw.	⅛	3/16	¼	5/16	⅜	7/16	½	9/16	⅝	¾
¾	2.50	2.80	3.10	3.75	4.40	5.00	6.25			
1	2.80	3.10	3.40	4.05	4.70	5.30	6.60	8.25		
1¼	3.10	3.40	3.70	4.35	5.00	5.60	7.00	8.60	11.25	
1½	3.45	3.70	4 00	4.70	5.30	5.95	7.40	9.00	11.90	15.00
1¾		4.05	4.35	5.05	5.65	6.35	7.80	9.45	12.60	15.60
2			4.70	5.45	6.25	6.85	8.40	10.00	13.35	16.25
2¼				5.95	6.85	7.40	9.00	10.60	14.15	17.10
2½					7.50	8.10	9.60	11.25	15.00	18.00
2¾						8.75	10.30	11.90	15.90	19.00
3							11.00	12.60	16.85	20.00
Threads to inch	40	30	20	18	16	14	12 or 13	12	11	10
Add for each ¼ inch	30	40	50	60	80	1.00	1.30	1.60	2.00	2.40

Dis., 25%.

MILLED FROM SOLID BAR.



Fillister. Bevel Head. Button Head

Diam. Head	3-16	¼	⅜	7-16	9-16	⅝	¾	13-16	⅞	1
Length Head	⅛	3-16	¼	5-16	⅜	7-16	½	9-16	⅝	¾
Diam. Screw	⅛	3-16	¼	5-16	⅜	7-16	½	9-16	⅝	¾
¾	2.00	2.25	2.50	3.00	3.50	4.00	5.00			
1	2 25	2.50	2.75	3.25	3.75	4.25	5.30	6.60		
1¼	2.50	2.75	3.00	3.50	4.00	4.50	5.60	6.90	9.00	
1½	2.75	3.00	3.25	3.75	4.25	4.75	5.90	7.20	9.50	12.00
1¾		3.25	3.50	4.00	4.50	5.00	6.20	7.50	10.00	12.50
2			3.75	4.35	5.00	5.50	6.75	8.00	10.75	13.00
2¼				4.75	5.50	6.00	7.25	8.50	11.50	13.75
2½					6.00	6.50	7.75	9.00	12.00	14.50
2¾						7.00	8.25	9.50	12.75	15 25
3							8.75	10.00	13.50	16.00
Threads to inch.	40	30	20	18	16	14	12	12	11	10

Head on Bevel and Button Head Screws, 1-16 larger in diameter than above specifications.

Price, according to size of head.

Discount, 50%; case hardened, 45%; case hardened and polished, 35%.

Soups (French). Franco-American Brand

	Per dozen. In Cans—Quarts.	Pints.	In Glass. 1½ pt.
Green turtle.....	$8.00	$4.32	$9.00
Terrapin.....			
Chicken	3.75	2.25	
Mulligatawny..			
Mock turtle.....			
Ox tail.....			4.50
Consommé.....			
Tomato.....			
Julienne.....			
Printanier.....	3.50	2.10	

French bouillon.....	
Mutton broth.....	
Vegetable.....	None in glass.
Beef.....	
Pea.....	

Packed in cases of..... 2 doz. 4 doz. 1 doz.

Regular Assorted Cases. In Cans—Quarts.

2 Chicken, 1 Mulligatawny, 3 Mock Turtle, 3 Ox Tail, 2 Consommé, 2 Tomato, 3 Julienne, 1 Printanier, 1 Mutton Broth, 1 Vegetable, 1 Beef, 2 French Bouillon, 2 Pea. Per doz., $3.55.

In Glass.

11 Chicken, 1 Mulligatawny, 2 Mock Turtle, 1 Ox Tail, 2 Consommé, 2 Tomato, 1 Julienne, Printanier, 1 Mutton Broth.

Terms cash Discounts: 5% for lots of 10 cases, 10% for ots 2 5 cases. 15% for lots of 50 cases.

Spades and Shovels.

The D. F. Jones Mfg. Co., of Gananoque (Ld.).

JONES'

Patent plain black solid cast-steel shovels and spades.

Patent solid steel shovel.

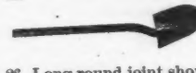
No.		No.	Per Doz. Black.	Per Doz. Pol's'd
20.	D. or long handle sq.-point shovels.	2	$15.50	$16.50
21.	" " " " " "	3	16.25	17.25
22.	" " " " " "	4	17.00	18.50
23.	" " " " " "	6	17.50	19.00
24.	" " " " charcoal.	8	20.50	22.00

Pt. plain back solid cast steel shovel.

25.	D or long handle round-point shovels.	3	16.25	17.25

Patent solid cast steel spade.

28.	D or long handle spades.....	2	16.00	17.00
29.	" " " "	3	16.50	18.00



Patent plain back solid cast steel.

26.	Long round joint shovel No. 2.....		15.50	16.50
27.	" square " " No. 2.....		15.50	16.50
32.	D. handle square-point molders' shovels.....	2	.....	17.00
33.	D. handle square point railroad, extra heavy.....	2	15.75	
34.	D. handle round point railroad, extra heavy	3	16.50	
35.	L. handle round point shovel, with foot cap.....	2	16.00	17.00

GRAY'S CAST.

Patent plain back solid-steel shovels and spades.

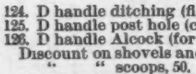
50.	D. or long handle sq.-point shovels.	2	$12.00	$13.00
51.	" " " " "	3	12.75	14.00
52.	" " " round point "	3	12.75	14.00
55.	D. handle spades.....	2	12.25	13.25
56.	" " "	3	13.00	14.25

Patent solid corrugated cast steel scoop.

SCOOPS.

Jones' patent plain back solid corrugated cast steel scoops.

90.	D. or long handle solid cast steel..	2	$13.50	$14.50
91.	" " " " " ...	4	14.50	15.50
91½.	" " " " " ...	6	16.50	17.50
	Jones' riveted scoops.			
92.	Cast steel D. or long handle.....	2	13.50	14.50
93.	" " " "	4	14.50	15.50
94.	" " " "	6	16.50	17.50
			Half polished.	
95.	" " "	8		$20.00
96.	" " "	10		22.50
97.	" " " Locomotive or coal (heavy).....	6	17.50	
98.	" Long or D. handle for salt heavy).....		17.50	
99.	" D. handle flour and house furnace.....		10.50	
100.	" D. handle r'd-pt. for coal (extra heavy).....	6	20.00	
101.	" ash pit, furnace L. handle.....	2		Polished. 13.00
102.	" " " 32 in. D..	2		13.50
103.	" " " 42 " iron D. handle.....	2		14.00



Ditching spade.

124.	D handle ditching (flat).....		18.00	19.50
125.	D handle post hole (concave).....		18.00	19.50
126.	D handle Alcock (for clay and brick)....		16.00	17.00

Discount on shovels and spades, 50 and 10.

" " scoops, 50.

Boxed f.o.b. New York, Boston or Montreal.

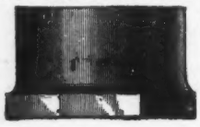
The solid shovels, spades and scoops are made from cast steel bars by a recently patented process, the blade and strap being in one piece, not welded. All goods are American patterns.

amp Head Shoes and Dies.

Shoe & Die (Adamantine), showing even wear from end to end.

Chrome Steel Works.

8 cents per lb f.o.b. New York.



Stencil Inks.

Black.

No.	Per can.	Per cake.	No.	Per can.	Per cake.
1.....	7 cents	3 cents	3.....	20 cents.	12 cents
2.....	10 "	5 "	4.....	30 "	20 "

Blue.

1.....	10 cents.	6 cents	3.....	30 cents.	22 cents
2.....	15 "	9 "	4.....	50 "	40 "

Red and Green.

1.....	12 cents	8 cents	3.....	50 cents.	42 cents
2.....	20 "	15 "	4.....	90 "	80 "

Per doz. cans or cakes, net, per gross, 10% less.

Indelible Ink.

Small bottles per	100	$2.75
" "	500	12.00
" "	1,000	20.00

STENCIL COMBINATIONS.

Contains Alphabet, Figures, Brush, and Ink.

½ inch, per doz.....	$5.00
¾ " "	5.40
1 " "	5.75
1¼ " "	7.50
1½ " "	8.40
2 " "	10.00
2½ " "	15.00

Dis., 10%.

Tools.

ARTISANS.

Chisel (Mason).

Stone, 5 and 8c. lb., net.

Mill Picks.

Cast steel. 2 to 3 lbs., $22 per doz.

Dis., 60 and 5%.

Stone Axes, Cast Steel.

All sizes, 50c. per lb.

Dis., 70 and 10%.

Five lbs. and over, 40c.; with teeth, 45c.; 3 to 5 lbs., 45c.; with teeth, 50c.; under 3 lbs., 50c.; with teeth, 55c.

Nos. 40 and 41, spalling or stone hammer, 5 lbs. and ver. 36c.; 3 to 5 lbs., 40c.; under 3 lbs., 45c. per lb.

Nos. 40 and 41, spalling hammers, 9 to 20 lbs., steel face, per lb., 17c.

Dis., 70 and 10%

Ship or Top Mauls, Steel Face.

4 to 8 lbs., 28c. per lb.

Dis., 50, 10 and 5%..

Steel Wedges, wood, 1st qual., 5c. lb.

Cooper Froes.

8 in..	⅋ doz.	$13.00
10 in..	⅋ doz.	13.50
12 in..	⅋ doz.	14.00
14 in..	⅋ doz.	14.50
16 in..	⅋ doz.	15.00

Discount, 60%.

60 days, 2% 10 days.

Vise.

No 1. Solid Box Vises.

		Each.
No. 25, 3¾ in.	Jaw.....	$12.00
" 30, 3½	"	11.00
" 55, 3⅞	"	10.00
" 40, 4	"	10.50
" 45, 4¼	"	11.00
" 50, 4½	"	11.50
" 55, 4½	"	12.00
" 60, 4½	"	13.00
" 65, 4¾	"	14.00
" 70, 5	"	15.00
" 75, 5	"	16.00
" 80, 5¼	"	17.50
" 85, 5¼	"	18.50
" 90, 5½	"	20.00
" 95, 5¾	"	21.00
" 100, 6	"	22.00
" 105, 6	"	23.00
" 110, 6¼	"	24.00
" 115, 6¼	"	25.00
" 120, 6½	"	26.00
" 125, 6½	"	27.50
" 130, 6¾	"	29.00

		Each.
No. 135, 6¾ in.	Jaw....	$31.50
" 140, 7	"	33.00
" 145, 7	"	35.00
" 150, 7	"	36.00
" 160, 7¼	"	41.50
No. 170, 7¼ in.	Jaw...	$44.50
" 180, 8	" ...	47.00
" 190, 8	" ...	53.00
" 200, 8	" ...	56.00

Dis., 60 and 10%.

MINERS.

Adze Eye Coal Picks.
Same list and dis. as No. 16.

Anthracite Coal Picks.
Same list and dis. as No. 16.

Stone Picks, per doz.

No. 18, 6 to 7 lbs... $16.50.
No. 18, 7 to 8 lbs... 17.50.
No. 18, 8 to 9 lbs... 18.50.

Dis., 60 and 5%.

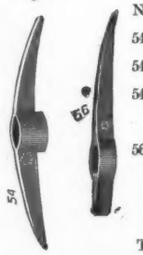
No.		Coal Picks.	Per doz.
16,	Weight, 2	lbs.....	$8.50
16,	" 2½	"	9.00
16,	" 3	"	9.50
16,	" 3½	"	10.00
16,	" 4	"	10.50
16,	" 4½	"	11.00
16,	" 5	"	11.50
16,	" 5½	"	12.00
16,	" 6	"	12.50
16,	" 6½	"	13.00
16,	" 7	"	14.00

Packages charged at cost. Dis., 60%.

Adze Eye Miners Picks—Surface, Drifting and Poll.

No.			Per doz.
19,	Surface.	No. 1, 4 lbs.....	$14.00
19,	"	No. 2, 4½ "	15.00
19,	"	No. 3, 5 "	16.00
19,	"	No. 4, 5½ "	17.00
19,	"	No. 5, 6 "	18.00
19,	"	No. 6, 6½ "	19.00
19,	"	No. 7, 7 "	20.00
20,	Drifting,	No. 1, 3 "	12.50
20,	"	No. 2, 4 "	14.00
20,	"	No. 3, 4½ "	15.00
20,	"	No. 4, 5 "	16.00
20,	"	No. 5, 6 "	17.50
21,	Poll,	No. 1, 3½ "	15.00
21,	"	No. 2, 4 "	16.00
21,	"	No. 3, 4½ "	17.00
21,	"	No. 4, 5 "	18.50
21,	"	No. 5, 6 "	20.00
21,	"	No. 6, 6¾ "	21.50

Dis., 60, 10 and 5%.



No.		Ore Picks.
54,	Adze Eye, 5 to 6 lbs.....	⅋ doz. $12.00
54,	" 6 to 7 "	" $13.00
54,	" to 8 "	" $14.00

56, Steel Lake Superior Mining Pick'

(Special Price and Quality.)

Dis, 60 and 10

Tamping Pic ks.

Adze eye, 6 to 7 lbs., per doz., $17.

Adze eye, 7 to 8 lbs., per doz., $18.

Adze eye, 8 o 9 lbs., per doz., $19.

Hunt eye, 6 to 7 lbs., per doz., $17.

Hunt eye, 7 to 8 lbs., per doz., $18.

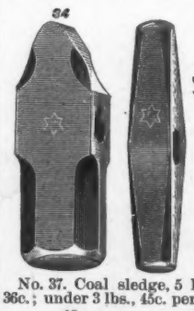
Hunt eye, 8 to 9 lbs., per doz., $19.

Dis., 60 and 10%.

Steel Face Hammers.

No. 43, hand drilling hammers, 2 to 5 lbs.; No. 45, napping hammers, 2 to 5 lbs.; No. 39, mason hammers, 3 to 8 lbs.; No. 42, smiths' hand hammers, 2 to 5 lbs.; No. 44, smiths' striking hammers, 2 to 5 lbs., all steel face, per b., 26c.

Dis., 70 and 10%.



Steel Face Sledges.

No. 34. Smiths' sledges, 6 to 30 lbs., steel face, 17c. per lb.

No. 35. Stone sledges, 6 to 30 lbs., steel face, 17c. per lb.

No. 36. Striking sledges, 6 to 30 lbs., steel face, 17c. per lb.

No. 37. Coal sledges, 5 to 10 lbs., steel face, 18c. per lb.

Cast Steel Sledges.

No. 34. Blacksmiths' sledge. 5 lbs. and over, 30c.; 3 to 5 lbs., 36c.; under 3 lbs., 45c. per lb,

No. 35. Stone sledge, 5 lbs. and over, 30c.; 3 to 5 lbs., 36c.; under 3 lbs., 45c. per lb.

No. 36. Striking sledge, 5 lbs. and over, 30c.; 3 to 5 lbs., 36c.; under 3 lbs., 45c. per lb.

No. 37. Coal sledge, 5 lbs. and over, 30c.; 3 to 5 lbs. 36c.; under 3 lbs., 45c. per lb.

No. 43, hand drilling hammer, 5 lbs. and over, 36c.; 3 to 5 lbs., 40c.; under 3 lbs., 45c. per lb.

Dis., 70 and 10%.

Cast Steel.

No. 42, blacksmiths' hand hammer, 5 lbs. and over 30c.; 3 to 5 lbs., 34c.; under 3 lbs., 45c. per lb.

No. 44, drilling or striking hammer, 5 lbs. and over, 30c.; 3 to 5 lbs., 36c.; under 3 lbs., 45c. per lb.

No. 45, napping hammer, 5 lbs. and over, 30c.; 3 to 5 lbs., 35c., under 3 lbs., 45c. per lb.

Dis., 70 and 10%.

RAILROADS.

Railway Track Punch

Round Point.
15c. lb., net.
Track Wrench.

7¾c. lb., net.
Rail Fork.

9c. lb., net.
Crow Bars.
Wedge Points,
3⅛c. lb., net.
Pinch Point,
3 ⅛c. lb., net.

65 Tamping Bar,
6c. lb., net.

66 Claw Bar,
7c. lb., net.

Railroad Spike Mauls
6 to 16 lbs., Steel Face
18c. lb.
Dis., 50, 10, and 5%.

Steel Track Chisel,
15c. per lb., net.

Railroad or Clay Picks.

No.				Per doz.
11, Adze eye,	4 to	5 lbs.		$11.00
11, "	5 to	6	"	12.00
11, "	6 to	7	"	13.00
11, "	7 to	8	"	14.00
11, "	8 to	9	"	16.00
11, "	9 to	10	"	18.00
12, Hunt eye,	4 to	5	"	11.00
12, "	5 to	6	"	12.00
12, "	6 to	7	"	13.00
12, "	7 to	8	"	14.00

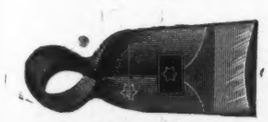
Dis., 60 and 10%.

Mattocks—Price per doz.
2, Adze Eye, Long Cutter, 6 lbs., $16.00.
3, Adze Eye, Short Cutter, 5½ lbs., $15.50.
2, Adze Eye, Long Cutter, Light, $15.00.
3, Adze Eye, Short Cutter, Light, $15.00.
4, Hunt Eye, Long Cutter, 6 lbs., $16.00.
5, Hunt Eye, Short Cutter, 5½ lbs., $15.50.

Adze Eye Pick Mattocks.....$16.

Hunt Eye Pick Mattocks.....$16

Dis., 60 and 10%.



Grub Hoes.
Western Pattern, No. 0, 3 lbs., ₱ doz., $10.50.
Western Pattern, No. 1, 3½ lbs., ₱ doz., $11.
Western Pattern, No. 2, 4 lbs., ₱ doz., $11.50.
Western Pattern, No. 3, 4½ lbs., ₱ doz., $12.
Baltimore Pattern, No. 1, 3½ lbs., ₱ doz., $11.
Baltimore Pattern, No. 2, 4½ lbs., ₱ doz., $11.75
Baltimore Pattern, No. 3, 5 lbs., ₱ doz., $12.75.
Baltimore Pattern, No. 4, 5¾ lbs., ₱ doz., $13.75.
Dis., 60 and 10%.

MACHINISTS'.

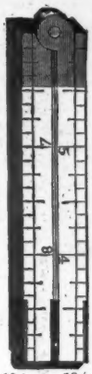
Combination Square, Bevel and Surface Gauge.

Price complete.....$3.00

Dis., 20, 10 and 5%.

Stanley Rule & Level Co.

CARPENTERS'.



BOXWOOD RULES.

Two feet, four-fold, 1 inch wide.

Plate.	Middle.	Edge.	Bound.
Round joint	$4	...	...
Square "	5	$7	$15
Arch "	6	8	16

Two feet, four-fold, 1⅜ inches wide.

Plate.	Middle.	Edge.	Bound.
Square joint	$7	$9	$18
Arch "	9	11	20

Two feet, two-fold, 1½ inches wide.

Square joint.	Arch.	Arch Bound.
$5	$7	$16
12	14	24

Gunter's Slide.

Dis. 80, 10 and 10%.

LEVELS.

	10 to 16 in.	18 to 24 in.
Arch top plate, 2 side views	$9.00	$12.00

PLUMBS AND LEVELS.

Arch top plate, 2 side views.

	12 to 18 in.	18 to 24 in.	24 to 30 in.
Polished	$14.00	$16.00	$18.00
Mahogany	....	16.50	22.50
Mahogany tp'd and lp'd	27.00	.....	.....
Polished and l pped	.....	.....	24.00
Polished and tipped	.....	.....	28.00
Polished, lip'd and tip'd	.....	.....	35.00

	in.	
Mason's level, 2 plumbs, polished,	36,	$30.00
Mason's level, 2 plumbs, p'd and t'd,	36,	36.00
Mason's level, 2 plumbs, polished,	42,	36.00

PATENT ADJUSTABLE PLUMBS AND LEVEL.

Arch Top plate, 2 side views	26 to 30 in.
Polished and lipped	$27.00
Polished and tipped	30.00
Polished, lipped and tipped	39.00
Mahogany	27.00
Mahogany, lipped	33.00
Mahogany, lipped and tipped	48.00
Polished, triple stock, lipped and tipped	48.00
Mahogany " " " " "	60.00
Rosewood, lipped and tipped	90.00

Dis., 70, 10, 10%.

POCKET LEVELS.

Iron top, Japanned	2 50
Brass top	3.00

Dis., 70, 10, 10%.

SCREWDRIVERS.

Varnished handles, pat. metallic fastening.
Size 1½, $1 per dozen; 2, $1.50; 3, $2; 4, $2.50; 5, $3; 6, $3.50; 7, $4; 8, $4.75; 10, $6; 12, $8.
Dis., 75 %.

PLANES, BAILEY'S PATENT IRON.

With pat. lateral adjustment.

Smooth, 8 in. × 1¾ in., $3; 9 in. × 2 in., $3.25; 10 in. × 2⅜ in., $3.75 each.
Jack, 14 in. × 2 in., $3.75.
Fore, 18 in. × 2⅜ in., $4.75
Jointer, 24 in. × 2⅜ in., $6.50 each.
Dis., 40, 10 and 10 %.

BAILEY'S PATENT WOOD PLANES.

Smooth.	Handle smooth.	
9 × 8¾ in.	8 × 2 in.	9 × 2 in.
$2	$2	$2.50 each

Jack.	Fore.	Jointer.
15 × 2⅜ in.	20 × 2⅜ in.	26 × 2⅜ in.
$2.50	$2.75.	$3.25 each

Dis., 40, 10 and 10%.

STANLEY IRON BLOCK PLANES.

3½ × 1 in. 20c.
5¼ × 1¼ in. 40c.
7½ × 1¾ in. 60c. each.

ADJUSTABLE.

5½ × 1¼ in. 60c.
7½ × 1¾ in. 85c. each.
Dis., 40, 10 and 10%.

STANLEY'S BEADING, RABBET, SLITTING AND MATCHING PLANE.

Eighteen Tools, Bits, etc.

$8 each. Dis., 20, 10 and 10%.

STANLEY "ODD JOBS."

Embraces in combination with ordinary Carpenters' Rule:

(1) Try square.
(2) Mitre square.
(3) T—— square.
(4) Marking gauge.
(5) Mortise gauge.
(6) Depth gauge.
(7) Mitre level.
(8) Spirit level and plumb.
(9) Beam compass.
(10) Inside square for making boxes and frames.

Price 75 cents.
Dis., 20, 10 and 10%.

TACK HAMMERS.

	Doz.
Magnetic, small	$1.25
Medium	1.50
Large	1.75

Discount, 30, 10, 10%.

MALLEABLE IRON.

Inlaid Handle.

Per Doz.....$2.50

Discount, 30, 10, 10%.

STEAK HAMMERS.

Japanned	$2.25
X Plated	3.00

Discount, 30, 10, 10%.

Trucks.

New York Pattern.

Size.	Length of handles. Ft.	In.	Width at nose. Inches.	Width at upper bar. Inches.	Size of wheel. Inches.	Price.
No. 0	3	6½	12	13¼	6½ × 1¾	$4.50
No. 1	4	1	13⅞	15⅝	6½ × 1¾	4.85
No. 2	4	5	15	16½	7¾ × 1⅞	6.00
No. 3	4	8	16	17¾	8¾ × 2¼	7.00
No. 4	5	0	16¼	17¾	9¾ × 2¼	8.00
No. 5	5	4	17¼	18⅞	10¾ × 2¾	9.50

Discount 50%.
Special net prices on quantity orders.

Tuyeres.

No. 2.	No. 4.
$25.00	$35.00 per doz.

20 % dis.

Valves. Brass Globe and Angle Valves.

Size, inches	⅛	¼	⅜	½	¾	
Star globe and angle valves	$0.80	$0.85	$0.90	$1.20	$1.55	$2.00
Star globe and angle valves, heavy patterns	...	...	...	1.50	1,95	2.80
Extra heavy Star and Lion patterns	...	...	...	2.00	2.60	3.60
All brass, yoke top	...	...	...	...	...	3.75
Cross valves	1.15	1.25	1.50	2.00	2.50	
Star check valves	.70	.70	.75	.95	1.20	1.65
do. heavy pattern	..	...	...	1.15	1.50	2.00
Crescent globe and angle valves	.60	.60	.75	1.00	1.35	1.80
Crescent hose valves	...	...	...	...	...	...
check valves	.50	.60	.60	.85	1.15	1.55
Vertical check v'lv's	.50	.60	.60	.85	1.15	1.55
Jenkins globe and angle valves	1.10	1.25	1.60	2.20	2.80	
Jenkins check valv's	1.10	1.20	1.30	1.90	2.60	
Gate valves, Chapman	...	...	...	1.30	1.75	2.25
Gate valves, other makes	...	...	1.00	1.20	1.75	2.50
Brass safety valves	2.00	2.25	2.75	3.50		5.00
Brass butterfly v'lv's	...	...	...	...		3.50

Size, inches	1¼	1½	2	2½	3
Star globe and angle valves	$3.00	$4.00	$6.50	$12.50	$19.00
do. heavy pattern	3.95	5.30	8.35	14.00	22.00
Extra heavy Star and Lion patterns	5.40	7.20	10.80	18.20	28.60
All brass, yoke top	5.00	7.00	10.00	18.00	30.00
Cross valves	3.50	5.00	8.00	16.00	24.00
Star check valves	2.50	3.25	5.00	11.00	15.00
do heavy pattern	3.00	4.00	6.50	12.50	17.00
Crescent globe and angle valves	2.80	3.90	5.90	11.25	16.00
Crescent hose valves	4.00	5.50	7.00	10.00	....
" check valves	2.30	3.25	5.20	10.00	14.00
Vertical check valves	2.30	3.25	5.20	10.00	14.00
Jenkins globe and angle valves	4.00	5.50	8.00	15.75	22.00
Jenkins check valves	3.60	5.00	7.50	13.50	20.50
Gate valves, Chapman	3.25	4.25	6.25	11.50	16.00
" " other makes	3.50	5.00	7.50	15.00	22.00
Brass safety valves	7.00	8.50	12.00	20.00	30.00
Brass outterfly valves	4.50	5.50	8.00	11.00	16.00

Pressure Regulating.

Mason Regulator Co.

Size pipe.	Price.	Size pipe.	Price.	Size pipe.	Price.
1 inch,	$22.	1¼ inch,	$28.	1½ inch,	$35.
2 "	44.	2½ "	57.	3 "	72.

Ludlow Valve Co.

Double Gate Brass Valves.

Gland in packing box.

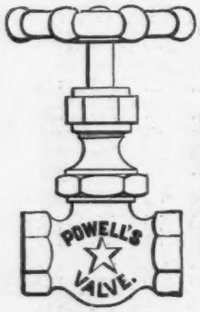
Size.	Screw socket.	Flange.	Diameter of Standard Flange.	Face to face of Screw socket	Face to face of Flanges.	Extra for slide stem and lever subject to discount.
In.	$	$	In.	In.	In.	
½	1.25	.....	.....	2¼	.....	$1.00
¾	1.65	.....	.....	2½	.....	1.00
1	2.15	.....	.....	2⅞	.....	1.00
1¼	3.15	.....	.....	3⅜	.....	1.00
1½	4.25	.....	.....	3¾	.....	1.00
2	6.25	11.50	6	4½	4⅝	1.00
2½	11.50	18.00	6¼	4 13-16	5⅜	1.25
3	16.00	22.00	7	5	6¼	1.25
3½	21.00	31.00	7½	.....	.....	1.25
4	35.00	43.00	9	.....	7 1-16	1.25
5	52.00	64.00	10	.....	.....	1.25
6	78.00	90.00	11	.....	9	1.25
8	.....	.....	.....	.....	.....	.....
10	.....	.....	.....	.....	.....	.....
12	.....	.....	.....	.....	.....	.....

Rubber-Faced Slide Gate Fire Hydrant.

Diameter of pipe connection.	Diameter of stand pipe.	Diameter of seat ring.	One 2½ nozzle.	Two 2½ nozzles.	Three 2½ nozzles.
Inches.	Inches.	Inches.			
3 or 4	4⅝	3	$28	$33.00	$35.00
3–4–6	5¾	4	31	38.50	40.50
4 or 6	7	5	.....	49.00	51.00
6 or 8	8	6	.....	.....	.....
8 or 10	10	8	.....	.....	.....

Four 2½ nozzles.	Six 2½ nozzles.	One steamer nozzle.	One steamer and one 2½ nozzle.	One steamer and two 2½ nozzles.	Frost case, standard length.
.....	.....	$33.00	$35.00	$37.00	$4.50
.....	.....	38.50	40 50	42.50	5.00
$53.00	.....	49.00	51.00	53.00	6.50
.....	.....	.....	.....	.....	7.50

For each 6 inches or less of stand pipe, add or deduct from list.	For each 6 inches more or less than standard length of frost case, add or deduct from list.	Extra charge for hub.	Independ't nozzle gates each.
$0.00	$0.44	.....	.....
.75	.50	6 in. $0.50	$3.50
.85	.70	No ch'ge	3.75
1.00	.90	8 in. $1.25	3.75
.....	.....	.....	4.50



Star Radiator Valves, with Brass T Handles or Wood Wheels.

Size, inches.....	½	¾	1
Plain brass....	$1.60	$2.00	$2.50
Plated trim'gs.	1.80	2.25	2.80
Rough & Plat'd	2.00	2.45	3.05
Finish'd & P'l't.	2.50	3.00	3.65

Size, inches.....	1¼	1½	2
Plain brass.....	$3.60	$4.80	$7.50
Plated trim'gs.	3.95	5.20	8.00
Rough & Plat'd	4.20	5.50	8.50
Finish'd & P'l't.	4.95	6.50	9.75

Dis., 40, 10 and 5%.

EDDY VALVES.

S. S. & O. S. Class L. & Y. 2. Class 2.

Class 3 and 4. Cl'ss 5.

Size.	Class 2. Iron, brass mounted. Screw, or flange ends.	Class 2. Iron, brass mounted. Add for S S&L	Class 3. All ir'n for gas. Hub. ends.	Class 4. Water works valves. Hub ends.	Class 5. Quick opening valves with rack and pinion stem. Iron, brass mounted. Hub ends.	Class 5. Screwed.	Class 5. Flanged.
⅜	$7.00	$1.00	$8.00	$10.00	$10.00	$9.00	$9.00
2½	10.50	1.30	.....	.....	15.00	14.00	14.00
3	13.00	1.40	10.00	15.00	20.00	17.00	17.00
3½	16.50	1.50	.....	.....	25.00	21.00	21.00
4	18.00	1.70	15.00	18.00	30.00	25.00	25.00
4½	22.00	1.80	.....	.....	.....	.....	.....
5	25.00	2.00	20.00	25.00	35.00	31.00	31.00
	31.00	2.30	25.00	31.00	40.00	37.00	37.00
	37.00	2.70	30.00	37.00	.....	.....	.....
	45.00	3.00	35.00	45.00	55.00	55.00	55.00
	60.00	3.50	48 00	60.00	.....	.....	.....
	80.00	4.00	65 00	80.00	.....	.....	.....

All Iron Valves, Classes 2 and 5, 10 per cent. less than Brass Mounted.

Varnish.

E.S. 1827 & Co.

Edward Smith & Co.

For Finishing Coats.	gal.
Wearing body varnish	$5.50
Medium drying body	5.50
One coat coach varnish	4.50
Wearing carriage	4.50
Heavy gear varnish	4.00
Coach body "	4.00
No. 1 coach "	2.25

For Under Coats.

Hard drying body	$4.50	Black rubbing varnish	$4.00
Rubbing body varnish	4.00	Priming (1st coat)	2.50
Quick rubbing "	3.50	Filling (2d coat)	2.50
		Rough stuff	2.50

For Inside Work.

Best flowing varnish	$4.50	Hard oil finish light	$2.75
Best polishing "	4.50	" dark	2.25
Cabinet "	3.00	White copal	4.00

Dryers.

Japan gold size	$3.50	Brown japan	$1.25
Coach japan	1.75	Liquid dryer	1.25

Discount, 40 per cent. f.o.b. N. Y.

Preservative Coatings.

Spar coatings	$4.00	Exterior car coating	$4.00
I. X. L. No. 1	2.50	Interior car coating	3.25
I. X. L. No. 2	4.00	Locomotive coating	4.00
Floor finish	2.50		

Discount, 35 per cent, f.o.b. N. Y.

Wagons, Carts, Etc.

D. F. Sargent & Son.

No. 0. Cart, top and fenders	$150
No. 1. Cart, top and fenders	90
No. 2. Cart, one man cart, open	65
No. 2. Cart, one man, top.	86
No. 2. Cart, one man, top and fenders	90
No. 3. Cart, two man, open	60
No. 3-H. Cart, two man, open	54
No. 4. Cart, two man, top.	86
No. 5. Cart, two man, top and fenders	90
No. 6. Cart, two men, top and fenders	90
No. 7. Two man combination cart	110

Wide track 5 feet.
Narrow track 4 feet 8 inches.
Discount 33⅓ per cent. off.

Wheelbarrows.

Climax Bolted Barrow, with Wood Wheel per doz.	$22.50.
1½ tire of iron,	
Common Nailed Barrow per doz.	$18.50.
" Bolted " " "	18.75.
Lansing's Patent Iron-Bolted Barrow, per doz.,	$25.50
Capital Patent Bolted Dirt " " "	30.00
Red oak or Government " " "	40.50
Wharf " " "	72.50
Mortar " " "	30.00
Bent Handle Stone " " "	48.00
Coal or Ore " " "	31.50
Pig Metal or Casting " " "	40.50
Brick Yard 20 inch Iron Wheel " each	10.50
Globe Patent Bolted Garden Barrow, Box 30 by 24 by 12 deep, wood wheel } per doz.,	42.50.
Capita Patent Barrows	
With Iron Tray, A, per doz.,	$39.00
" " " B, " "	42.00

The Leader Iron and Steel Barrows.
Gas-pipe Legs and Handles in one price.

No. 1 Tray of 16 iron, capacity } cu. ft. of earth, each	$12.
No. 2 " " 14 " " 5 " " " "	
or 250 lbs. of coal	" 15
3 Galvanized 18 iron, capacity same as No. 2	" 15

Whiffletree.

JAFFERY MFG. CO.

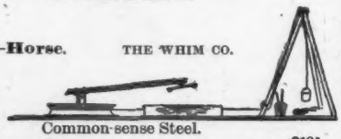
Willson spring Jeffery Manufacturing Company's.

	Single.	Double.
No. 1, 34 or 36 inches long	$1.25	$2.50
No. 2, " " "	1.40	2.75
No. 3, " " "	1.50	3.00
No. 4, " " "	1.65	3.25

Including either steel hooks or rings'
Discount, 45 and 5%.

Whims—Horse.

THE WHIM CO.



Common-sense Steel.

F. O. B. $125

Dis., 25%., in car lots.

Wire Goods.

Fly Traps.	Per gross.
Paragon	$18.00
Balloon	15.50

Dis., 10%.

Windmills.

A. J. CORCORAN.

Patent Storm Defying Pumping Mills.

Wheel.	Weight, boxed.	Cubic feet.	Price.
8½ ft.	650 lbs.	55	95.00
10 "	700 "	75	120.00
12 "	900 "	95	150.00
14 "	1,350 "	135	250.00
16 "	1,850 "	195	375.00
18 "	2,150 "	250	450.00
20 "	3,500 "	335	600.00

Dis., 25%.

25	"	5,400 lbs.	450	775.00

Dis., 20%.

30	"	9,500 lbs.	795	975.00

Boxing for export extra.

Corcoran Storm Defying Geared Wind mills for Driving Machinery.

Price includes upper set of Bessemer steel gears, one length of shaft.

Dia.	H. P.	Weight.	Cu. ft.	Price.
16 ft.	2½	1,900 lbs.	200	$400.00
20 "	5	3,600 "	340	650.00
25 "	6½	5,400 "	355	850.00
30 "	8	9,600 "	816	1,150.00
36 "	10	12,000 "	856	1,500.00
40 "	12	14,500 "	896	2,000.00
50 "	30	16,500 "	956	3,500.00
60 "	40	20,000 "	1,015	4,500.00

Dis., 25%.

10 ft. pumping	$75	Plus cost of packing.
12 ft. "	95	
14 ft. "	140	
16 ft. "	225	

Dis., 50 per cent.

EMMERT & LAMB.

"Stover" Pumping Windmills (no tower).

Size wheel.	Wt. packed.	Cubic ft.	Price.
10 ft.	650	50	$80.00
12 ft.	750	58	100.00

"Zenith" Pumping Windmills (no tower)

10 ft.	650	48	85.00
12 ft.	750	57	110.00

Dis., 50 per cent.

14 ft.	1,400	108	160.00
16 ft.	1,600	114	250.00

Dis., 45 per cent.

20 ft.	2,950	220	400.00
25 ft.	4,225	280	600.00

Dis., 40 per cent.

"Zenith" Geared Windmill (no tower).

Prices include upper set of Gears and about 5 feet vertical extra heavy shaft in windmill head.

14 ft.	1,550	178	260.00
16 ft.	1,780	198	300.00
20 ft.	3,170	216	500.00

Dis., 40 per cent.

Wire Cloth.

Brass and Copper Wire Cloth.

No. Mesh.			Price per foot.	No. Mesh.			Price per foot.
2	from No. 10	wire	$2 50	20	from No. 26	wire	$.80
3	" 11	"	2.50	22	" 27	"	.80
4	" 12	"	2.50	24	" 28	"	.80
5	" 13	"	2.50	30	" 30	"	.65
6	" 14	"	2.50	40	" 32	"	.70
8	" 16	"	2.50	50	" 34	"	.75
10	" 18	"	2.00	60	" 35	"	.78
12	" 19	"	2.00	70	" 37	"	.70
14	" 22	"	1.10	80	" 38	"	.90
16	" 24	"	.80	90	" 39	"	1.10
18	" 25	"	.80		Dis., 60%.		

Wire Rope.

JOHN W. MASON & CO.

Circumference in inches.	Diameter in inches.	Price in cents per foot best crucible cast steel rope. 19 wires to strand.	Price in cents per foot best crucible cast steel rope. 7 wires to strand.	Price in cents per foot best bright iron rope. 19 wires to strand.	Price in cents per foot best bright iron rope. 7 wires to strand.	Price in cents per pound galvanized iron rope. 12 wires to strand.	Price in cents per pound galvanized iron rope. 7 wires to strand.
5⅛	1¾	100	.....	69	.....	11	10½
5¼	.....	90	.....	64	.....	"	"
5	1⅝	80	.....	58	.....	11½	"
4¾	1½	71	.....	53	.....	"	"
4½	.....	65	.....	48	.....	"	"
4¼	1⅜	60	60	43	39	"	"
4	1¼	50	50	36	34	"	"
3¾	.....	46	.....	33	.....	"	"
3½	1⅛	41	40	29	27	12	10¾
3¼	.....	.....	.....	.....	.....	"	11
3⅛	1″	34	32	26	23	.....	.....
3	.....	33	.....	24	.....	"	11
2¾	⅞	27	25	20	19	.....	"
2½	.....	23	.....	18	.....	.....	11½
2¼	¾	21	19	16	14	.....	12
2	⅝	18	14	14	10½	.....	13
1¾	9-16	17	11	12	8	.....	14
1½	½	15	8	10	7	.....	16
1¼	⅜	.....	7	8	5	.....	17
1	5-16	.....	5	.....	4	.....	18

Discounts, for export in bond, requiring from four to six weeks time, 55%.